Barracuda Networks Technical Documentation

Barracuda **Link Balancer**

Administrator's Guide

Version 2.2

RECLAIM YOUR NETWORK™

Contents

Chapter 1
Introduction

This chapter provides an overview of the Barracuda Link Balancer and includes the following topics:

Overview

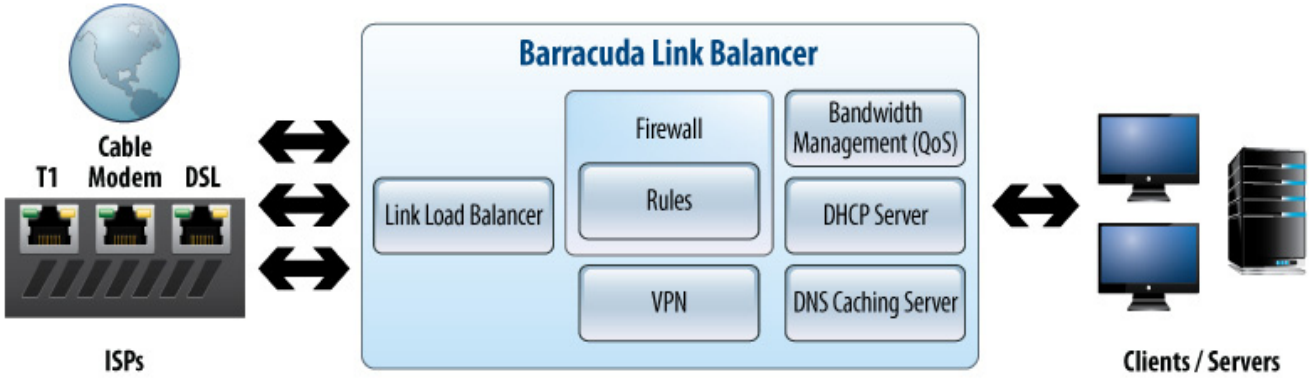
The Barracuda Link Balancer routes and manages traffic across multiple Internet connections or WAN links. By using multiple inexpensive connections from one or more Internet service providers, you can reduce the need to purchase high speed and high cost links. Supported links include T1, T3, E1, DSL, cable, fiber optic and MPLS. The Barracuda Link Balancer:

- balances incoming and outgoing network traffic across multiple links
- provides automated failover in case of link failure
- manages bandwidth
- performs Quality of Service (QoS) for Internet applications
- includes DHCP server and DNS caching server functionality
- can act as a traditional firewall or can be installed in front of your existing firewall
- provides site-to-site VPNs with link failover and failback.

The Barracuda Link Balancer is *not* designed for load balancing that distributes incoming traffic across servers. If you are interested in that functionality, the Barracuda Load Balancer may meet your needs.

As shown in *Figure 1.1*, the Barracuda Link Balancer provides an interface between multiple Internet connections and your clients and servers.

Figure 1.1: Barracuda Link Balancer Functionality



About this Guide

This guide provides a general discussion of the features and concepts that you need to understand in order to best configure the Barracuda Link Balancer. Other than the installation instructions that are in *Installing the Barracuda Link Balancer* on page 7, you will find that detailed, procedural configuration steps are in the online help of the Web user interface.

When referring to specific feature settings, this guide specifies the name of the tab in the Web user interface followed by a (>) and the actual page name. For example, you can view link utilization and performance statistics on the **Basic > Status** page.

Features of the Barracuda Link Balancer

This section describes the features of the Barracuda Link Balancer:

Link Management

The Barracuda Link Balancer can manage links that have static or dynamic (DHCP) IP addresses and can authenticate using PPPoE.

Aggregating Link Bandwidth

The Barracuda Link Balancer automatically aggregates Internet bandwidth from multiple links to the same or diverse sources. Administrators can choose multiple links to the same or different ISPs for the purposes of consolidating access to affordable Internet bandwidth.

Any single session (e.g. a TCP stream) has at most only the bandwidth from any one WAN link. One computer may have more than one session if it is connected to more than one remote site.

Link Failover

The Barracuda Link Balancer regularly checks the health of each Internet link and only uses the available links. If it detects a link failure, the failed link is removed from link balancing. When the failed link becomes available again, the Barracuda Link Balancer will resume using that link. All of this happens without administrator intervention.

If a link fails, existing sessions on that link will be disconnected. Clients who were using the failed link will be able to reconnect quickly to their destination using another available link rather than having to wait for the original link to be restored.

Outbound Link Load Balancing

When traffic from a client IP address going to a new destination IP address is detected, the Barracuda Link Balancer selects which link to use. It calculates the available capacity for each link based on uplink speed and current usage and uses the link with the largest available capacity. If needed, you can create outbound routing rules to override this behavior.

Inbound Link Balancing and Failover

The Barracuda Link Balancer uses authoritative DNS to direct incoming connections to a WAN link. When an external user accesses a Web site, for example, that is hosted behind the Barracuda Link Balancer, a DNS request is sent to the Barracuda Link Balancer for the IP address of the site. The Barracuda Link Balancer returns the IP address of the site which directs the traffic to a WAN link.

When determining which IP address to return, the available capacity for each link based on configured speed and current usage is calculated. The link with the largest available capacity is returned so that adaptive inbound load balancing is achieved. Also, if a link is found to have failed, the address for that link is not returned until it becomes available again.

In order to accomplish this, the Barracuda Link Balancer acts as an authoritative DNS server for the domains or sub-domains that you host. You can create DNS records on the Barracuda Link Balancer to identify your domain and to map that domain to multiple externally accessible IP addresses.

VLAN Support

The Barracuda Link Balancer supports Layer 2 VLANs.

High Availability

The Barracuda Link Balancer supports High Availability configurations where two Barracuda Link Balancers are deployed as an active-passive pair.

Persistence

The Barracuda Link Balancer automatically tracks the IP addresses of each client / source and corresponding server / destination. As long as the source and destination IP address pair are the same, traffic between them will use the same link. In addition, any one source and destination IP address pair will be tied to a specific link through about 15 minutes of inactivity. If traffic from an already tracked source IP address is detected, it may be sent on a different link if the destination IP address is unique.

Bandwidth Management and Quality of Service (QoS)

The Barracuda Link Balancer includes software that can automatically prioritize critical Internet applications. For example, you can assign priority to Web browsing and email while giving peer-to-peer applications and media streaming a lower priority. In this way, you can ensure that bandwidth-intensive applications do not interfere with business-critical operations.

Traditional Firewall

The Barracuda Link Balancer incorporates standard firewall functionality, including:

- Network Address Translation (NAT):
  - IP masquerading - Clients in the internal network are protected from the Internet. All Internet services appear to be provided by the Barracuda Link Balancer firewall, while the internal clients remain invisible.
  - 1:1 NAT - You can directly assign external addresses to internal servers. Ideal for hosting internal applications or services requiring regular outbound requests such as SMTP, 1:1 NAT provides a secure method to match additional external addresses with a single internal server for inbound and outbound traffic.
  - Port forwarding (or Port Address Translation) - The traffic to the same port across one or more multiple links is directed to an internal client.
  - Many to 1 NAT - One internal server may receive traffic from more than one WAN link. You can achieve this by creating 1:1 NAT rules or port forwarding rules.
- IP access lists - Use IP access lists to allow or deny access, either inbound or outbound, to remote networks, clients, applications, services and ports.
- Port blocking.
- Assistance in preventing and mitigating distributed denial of service attacks (DDoS).

Site-to-Site VPN and Link Failover

You can create a site-to-site VPN tunnel between two Barracuda Link Balancers or between a Barracuda Link Balancer and another device that supports IPsec. Networks connected via a tunnel will communicate as if they are on the same network, even though they are separated by the Internet.

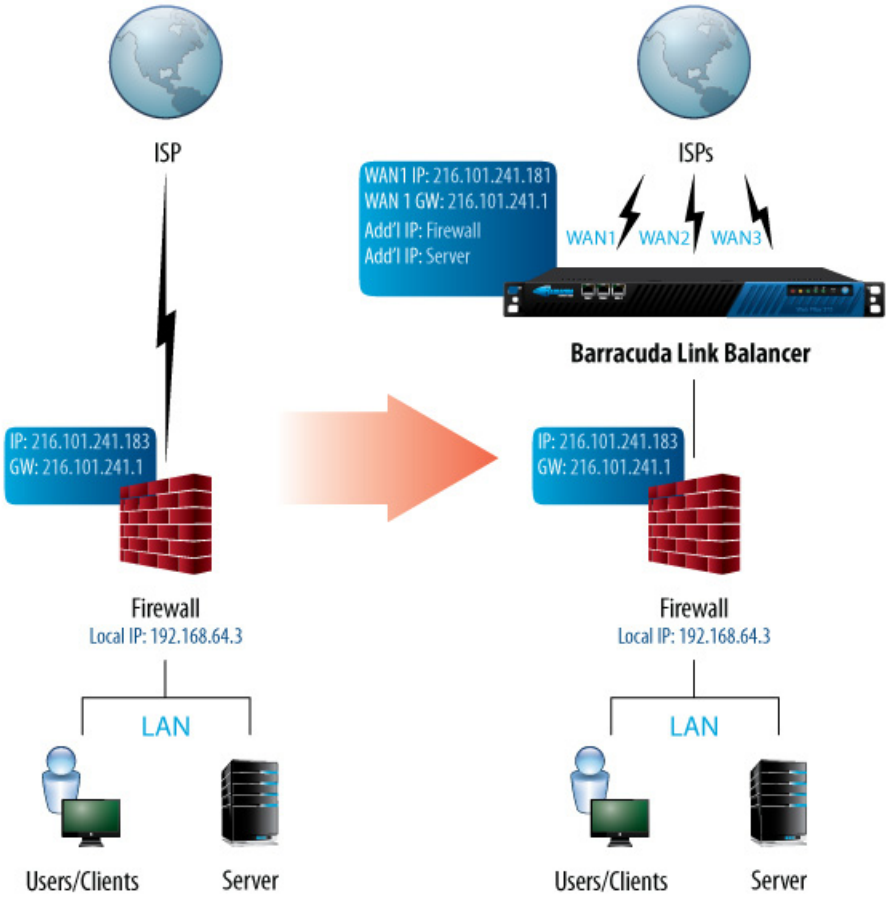
Using this functionality allows your site-to-site VPN tunnel to automatically failover to a secondary link in the case of the failure of a primary link.

Ability to Deploy with Your Network Firewall

If you already have a firewall that meets your needs, you can use the link balancing, failover and bandwidth management capabilities of the Barracuda Link Balancer and disable its firewall functionality.

As you can see in *Figure 1.2*, adding the Barracuda Link Balancer to your network without removing your firewall can be done with minimal disruption to your existing network.

Figure 1.2: Deploying with an Existing Network Firewall



Local Network Services

The Barracuda Link Balancer includes the following local network services:

- DHCP server - The Barracuda Link Balancer can automatically provision client IP addresses using the DHCP protocol. Along with defining traditional DHCP options, administrators may view active leases in real time.
- DNS caching server - The Barracuda Link Balancer caches responses to DNS queries so that repetitive DNS requests are served quickly and locally.

Reporting

A variety of trend and activity reports for the WAN links, VPNs and other system components can be generated on-demand or scheduled. Reporting is only available on models 330 and above.

Web User Interface

The Barracuda Link Balancer configuration can be administered through an SSL-secured Web user interface. Access can be through the LAN or, if configured, any of the WAN interfaces. The Web user interface can also be used for viewing traffic statistics, monitoring the health of network components and doing troubleshooting.

Technical Support

To contact Barracuda Networks Technical Support:

- By phone: call 1-408-342-5400, or if you are in the United States, (888) Anti-Spam, or (888) 268-4772
- By email: use *support@barracuda.com*
- Online: visit *http://www.barracuda.com/support* and click on the **Support Case Creation** link.

There is also a Barracuda Networks Support Forum available where users can post and answer other users' questions. Register and log in at *http://forum.barracuda.com*.

Chapter 2

Installing the Barracuda Link Balancer

This chapter provides instructions for installing the Barracuda Link Balancer. It includes the following topics:

Once you have chosen your deployment scenario, go to the section that describes how to install your Barracuda Link Balancer in that configuration. There are many steps and some are similar between the methods, but for ease of configuration they are in different sections.

Deployment Scenarios

The two most typical deployment methods are:

- *In Front of Firewall* on page 8 - Keep your existing firewall, and insert the Barracuda Link Balancer in between your firewall and the Internet. The Barracuda Link Balancer firewall is disabled in this case.
- *Replacing Your Firewall Installation* on page 15 - Replace your firewall with the Barracuda Link Balancer.

One important factor in deciding which deployment mode to choose is whether you want to replace your firewall or keep your existing firewall.

The Barracuda Link Balancer firewall provides full firewall functionality. If, however, you already have a firewall that meets your needs, you can disable the Barracuda Link Balancer firewall while still making use of the Barracuda Link Balancer's link balancing, failover and bandwidth management capabilities.

Table 2.1 shows factors to consider when choosing a deployment mode.

Table 2.1: Deployment Modes

	In Front of Firewall	Replacing Your Firewall
Network Location	The Barracuda Link Balancer is deployed between your existing firewall and the Internet.	The Barracuda Link Balancer acts as your firewall.
Barracuda Link Balancer LAN IP address	Used only for management. Can be any internal or public address that is reachable through your existing firewall from the LAN.	The default gateway for your network.
Firewall Rules	No changes to your existing firewall.	You will need to recreate any existing firewall rules on the Barracuda Link Balancer.

Table 2.1: Deployment Modes

	In Front of Firewall	Replacing Your Firewall
WAN Link	If you are enabling inbound access to resources behind the Barracuda Link Balancer, such as a Web server, at least one WAN link must have a static IP address.	The Barracuda Link Balancer may use the same IP address that had been used by your firewall.
Site to Site VPN	If you already have a site to site VPN it should be terminated on your existing firewall. VPN traffic has one source IP address so it goes out on only one WAN link. It is recognized as VPN traffic so it will not be NAT'd by the Barracuda Link Balancer. No failover or failback is available. Alternatively, make the Barracuda Link Balancer a VPN endpoint to achieve failover and failback to and from a secondary link.	Failover and failback to and from a secondary link.

In Front of Firewall

Figure 2.1 gives an example of a customer network that has both client and server traffic.

Figure 2.1: Deployment Example - before Barracuda Link Balancer

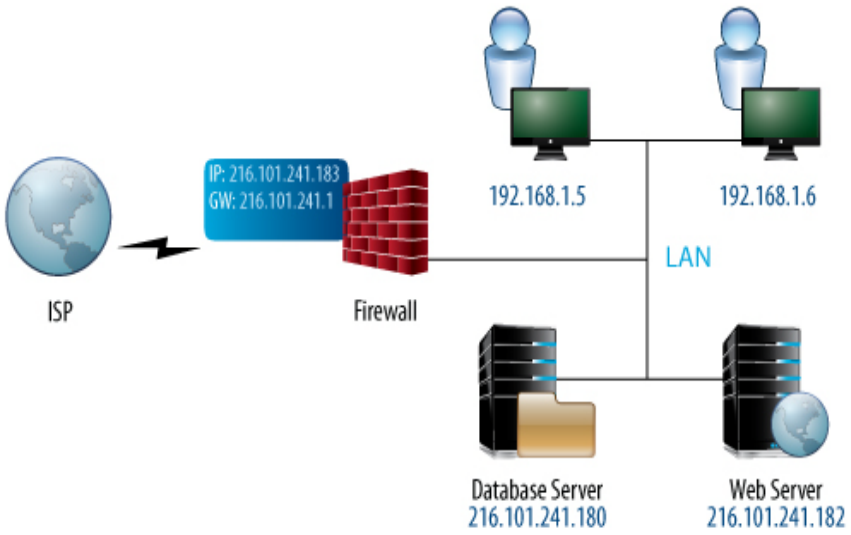


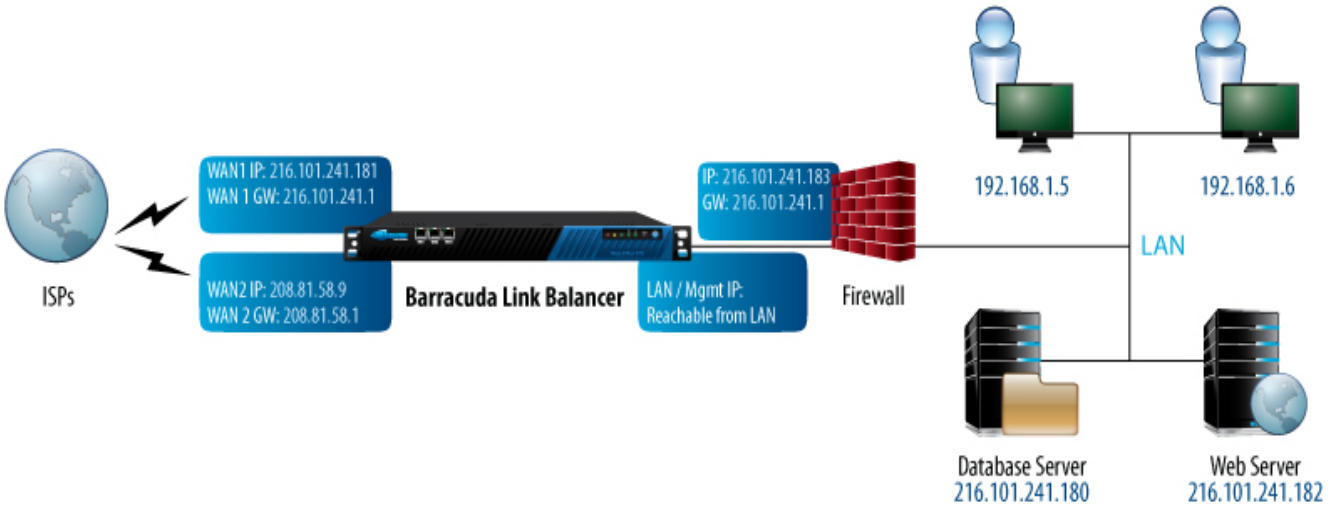
Figure 2.2 shows the same network with a Barracuda Link Balancer that was installed with no changes to the configuration of the existing firewall. A new WAN link has been added.

In this network:

- The Barracuda Link Balancer has a static IP address on WAN1 that is on the same network as the firewall and the externally visible servers.
- The clients are on a different subnet than all WAN links.
- The external IP address and gateway of the firewall remain the same.
- The gateway IP addresses of the Barracuda Link Balancer and the firewall are provided by the ISPs. The gateway of the LAN devices is provided by the firewall.

- The Barracuda Link Balancer LAN IP address can be any internal or public address that is reachable through your existing firewall from the LAN. You may allocate an external IP address for it, or choose a non-routable IP address. If the latter, it should be on a different subnet than the LAN devices already on the network. Remember that if the firewall does not recognize an address as being on the local network it will pass it to the Barracuda Link Balancer.

Figure 2.2: Deployment Example - Barracuda Link Balancer in front of firewall



Replacing Your Firewall

Figure 2.3 gives another example of a customer network that has both client and server traffic.

Figure 2.3: Deployment Example - before Barracuda Link Balancer

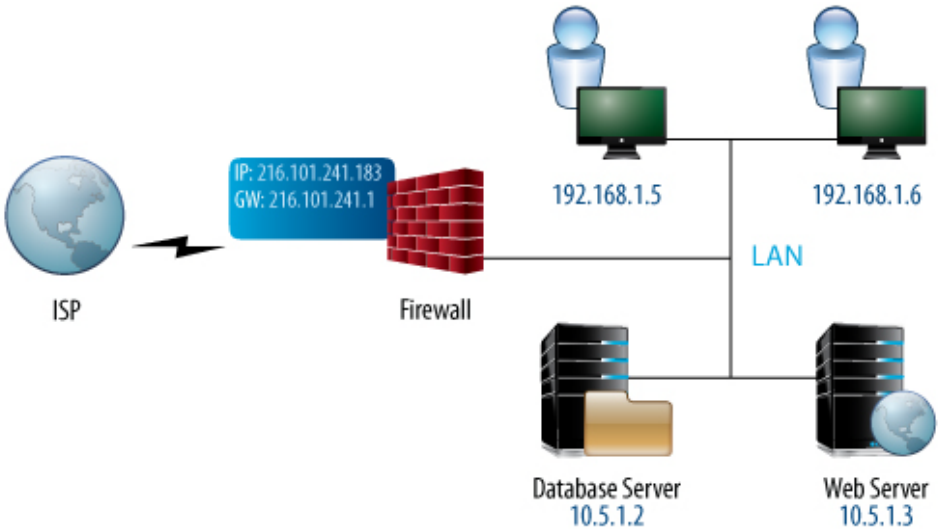


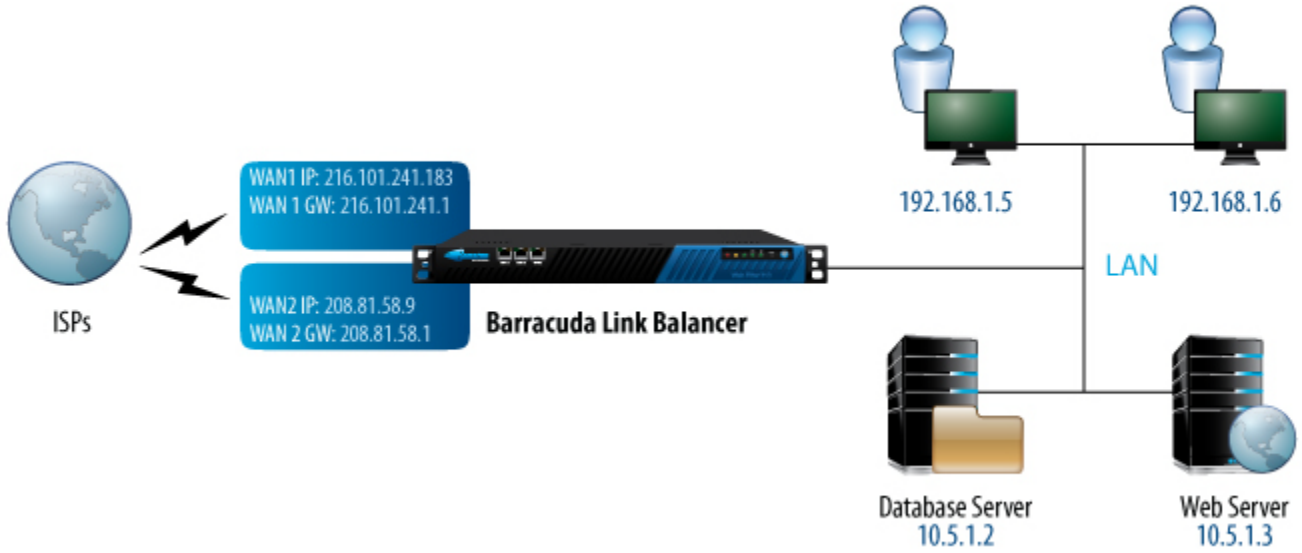
Figure 2.4 shows the example network with a Barracuda Link Balancer installed and acting as a firewall, replacing the customer firewall. A new WAN link has been added.

In this network:

- The Barracuda Link Balancer uses the same IP address for WAN1 that the firewall had used.
- The LAN devices and the LAN interface of the Barracuda Link Balancer must be on a different subnet than all WAN links.
- The Barracuda Link Balancer gateway IP addresses are provided by the ISPs.
- The gateway of the LAN devices is the LAN IP address of the Barracuda Link Balancer.
- Traffic to the servers is passed using port forwarding rules on the Barracuda Link Balancer.

If your servers are externally accessible, reconfigure those servers with private IP addresses. Then create 1:1 NAT rules to map the external IP addresses to the respective private IP addresses of the servers.

Figure 2.4: Deployment Example - Barracuda Link Balancer replacing the firewall



Overview of the Installation Steps

Table 2.2 provides an overview of the steps required to deploy the Barracuda Link Balancer in your network.

Table 2.2: Installation Steps

In Front of Firewall	Replace Your Firewall
Prepare to install, including getting a WAN link with a static IP address.	Prepare to install.
Activate the Barracuda Link Balancer with Temporary Network Settings.	Activate the Barracuda Link Balancer with Temporary Network Settings.
Get Latest Firmware Version.	Get Latest Firmware Version.
Disable the Barracuda Link Balancer Firewall.	Configure Permanent WAN Settings.

Table 2.2: Installation Steps

In Front of Firewall	Replace Your Firewall
Configure WAN and LAN Permanent Settings.	Configure the Barracuda Link Balancer Firewall.
Permanently Install the Barracuda Link Balancer.	Configure Permanent LAN IP Address.
Test Connectivity.	Permanently Install the Barracuda Link Balancer.
	Test Connectivity.

In Front of Your Firewall Installation

These detailed instructions describe how to deploy the Barracuda Link Balancer between the Internet and your firewall. They provide a method to configure the Barracuda Link Balancer completely before connecting it to your production system.

Note: In this mode with the Barracuda Link Balancer's firewall disabled, it is necessary to use an additional static IP address in order to deploy the Barracuda Link Balancer. If you do not have an extra static IP address, you may need to order one from your ISP.

Step 1: Prepare for the Installation

Before installing your Barracuda Link Balancer, complete the following tasks:

1. Verify you have the necessary equipment:
   - Barracuda Link Balancer, AC power cord (included)
   - Ethernet cables
   - a PC with a Web browser

   Plug in the Barracuda Link Balancer and power it on.
2. If you are enabling inbound access to resources behind the Barracuda Link Balancer, such as a Web server, you must provide at least one WAN link with a static IP address for receiving the incoming traffic.

Step 2: Activate the Barracuda Link Balancer with Temporary Network Settings

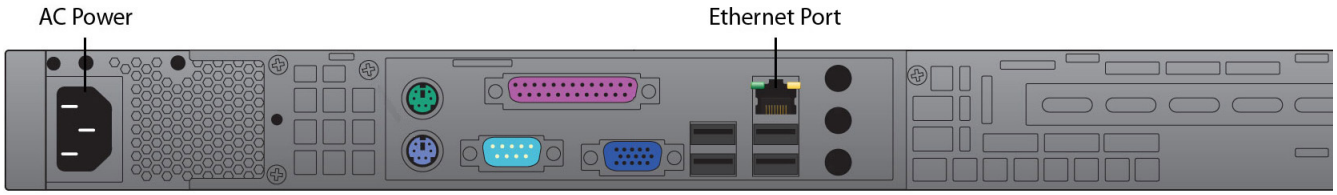
Follow these steps to configure the Barracuda Link Balancer with temporary settings and activate it:

1. Change the network settings of a PC with a Web browser installed to use an IP address of 192.168.200.10, subnet mask of 255.255.255.0 and gateway of 192.168.200.200. Depending on the model, there may be a LAN port on the front of the Barracuda Link Balancer. If there is, connect an Ethernet cable from the PC to that LAN port.

Figure 2.5: Front panel of a Barracuda Link Balancer with LAN port

Otherwise, connect an Ethernet cable from the PC to the LAN port on the back, as shown in *Figure 2.6*.

Figure 2.6: Back panel of the Barracuda Link Balancer



2. Start the Web browser and access the Web user interface by typing `http://192.168.200.200:8000`. The default username is **admin** and the default password is **admin**.
3. Go to the **Basic > Links** page and double click on one of the WAN ports in the graphic. In the **Links Configuration** section set the **Type** of the WAN link to DHCP to acquire an address in the office network. Alternatively, set the link **Type** to Static and enter a specific IP address. Click **Save Changes**.
4. Connect an Ethernet cable from the corresponding WAN port on the front of the Barracuda Link Balancer into your office network. You should now have Internet connectivity from your PC.
5. At the top of every page, you may see the following warning:

Click on the link in the warning message or use the link on the **Basic > Status** page to open up the **Barracuda Networks Product Activation** page in a new browser window. Fill in the required fields and click **Activate**. A confirmation page opens to display the terms of your subscription.

On the **Basic > Status** page, you may need to enter the activation code from the **Barracuda Networks Product Activation** page to activate your Barracuda Link Balancer.

Note: If your subscription status does not change to *Current*, or if you have trouble filling out the **Product Activation** page, call your Barracuda Networks sales representative.

Step 3: Update Firmware

Go to **Advanced > Firmware Update**. If there is a new **Latest General Release** available, perform the following steps to update the system firmware:

1. Read the release notes to learn about the features of this firmware update.
2. Click the **Download Now** button located next to the Latest General Release firmware version. Click **OK** to acknowledge the download duration message. To avoid damaging the Barracuda

Link Balancer, do not power off during an update or download. To view the progress of the download, click **Refresh**. You will be notified when the download is complete.

3. Click **Apply Now** to apply the firmware. Click **OK** to acknowledge the reboot message. Applying the firmware takes a few minutes to complete.
4. After the firmware has been applied, the Barracuda Link Balancer automatically reboots. When the system comes back up, the login page is displayed. Log in again.

Step 4: Disable the Barracuda Link Balancer Firewall

Because you are going to use your existing firewall, you must disable the Barracuda Link Balancer firewall:

1. Go to the **Basic > IP Configuration** page and disable the firewall. Click **OK** to acknowledge the reboot message.
2. The Barracuda Link Balancer will reboot.

Step 5: Configure WAN and LAN Permanent Settings

Configure the permanent settings for the WAN links that will be connected to the Barracuda Link Balancer. Some of the configuration information for the WAN links is provided by your ISP. Be sure to enter these values correctly.

1. Unplug the Ethernet cable connecting the WAN port to your office network.
2. After the Barracuda Link Balancer has rebooted, login to the Web user interface and go to the **Basic > Links** page.
3. For each link that will be connected to this unit:
   - **3a.** Click the relevant WAN port in the graphic.
   - **3b.** In the Links Configuration section enter the details for the link to be connected to the WAN port.

     If the interface uses a static IP address, then you will see the **Additional IP Addresses** list. These are the externally reachable IP addresses that are behind the Barracuda Link Balancer, including the address of your firewall. These need to be identified so that traffic can be accepted and directed to them. The Barracuda Link Balancer is able to locate these addresses automatically, so creating this list is optional but may cause a slight increase in efficiency. To manually create the list, enter the IP addresses or click **Discover** to populate a list of IP addresses of live systems that are on the same Class C network as this WAN interface. The **Discover** button is only visible if there are no entries in the Additional IP Addresses list and if the built-in firewall is disabled.
   - **3c.** Click **Save Changes**.

Note: If you are enabling inbound access to resources behind the Barracuda Link Balancer, such as a Web server, you must provide at least one WAN link with a static IP address for receiving the incoming traffic.

4. If desired, change the LAN/Management IP address of the Barracuda Link Balancer to its permanent setting. The LAN IP address is only used for management of the Barracuda Link Balancer. (The WAN IP addresses can also be used to access the management interface).

   The LAN IP address can be any internal or public address that is reachable through your existing firewall from the LAN. You may allocate an external IP address for it, or choose a non-routable

IP address. If the latter, it should be on a different subnet than the LAN devices already on the network. Remember that if the firewall does not recognize an address as being on the local network it will pass it to the Barracuda Link Balancer.

If the default address of 192.168.200.200 meets this criteria, there is no need to change it.

To change the LAN/Management IP address,

Go to the **Basic > IP Configuration** page and change the Management IP Address and Subnet Mask. Click **Save Changes**. If the address is on a different subnet, your connection will terminate.

5. Power down your Barracuda Link Balancer using the power button on the front of the unit.

Step 6: Install in the Production Network

Now that the Barracuda Link Balancer is configured, install it in its permanent location and connect it to your WAN links:

1. Mount the Barracuda Link Balancer in a 19-inch rack or place it in a stable location. To ensure proper ventilation, do not block the cooling vents on the front and back of the unit.
2. Connect each of the cables from the Internet links into a WAN port on the front of the Barracuda Link Balancer. The ports are labeled WAN1, WAN2, etc. These ports correspond to the WAN ports that you configured in the Web user interface. Be sure to connect them according to your configuration.
3. If there is a LAN port on the front of the Barracuda Link Balancer, connect an Ethernet cable from the outside interface of your existing network firewall to that LAN port. If there is no LAN port on the front, connect the outside interface of your existing network firewall to the LAN Ethernet port on the back panel of the Barracuda Link Balancer. You should see some activity on both the yellow and green lights on the LAN port. If not, you may need to use a crossover cable.

Step 7: Test Connectivity

Now you are ready to test the connectivity to your existing firewall and the systems connected to it. There is no need to change your firewall network configuration - your network firewall should continue to use the ISP provided gateway address.

1. Confirm that you can access the Internet from a client computer on your LAN. If this works, continue.
2. On the test system, log into the Web user interface using the permanent LAN IP address and go to the **Basic > Links** page. The status of each link should appear as **Connected**. You can see the utilization of each link by moving the mouse over the graphic.

   On the test system, generate some traffic, by, for example, opening more tabs in the browser of the test system and downloading files from the Internet. You can FTP files from a number of different sites or use torrent to get the traffic to flow on multiple links. Go to the **Basic > Status** page to view graphs that show the incoming and outgoing traffic for each link..

Note: If you have connectivity issues, clear the ARP caches of your existing network components such as the firewall, routers and modems. In some cases, you may need to reboot these devices.

You do not need to update your existing firewall configuration unless you want to make it aware of the new WAN link(s). To do so:

1. Add firewall rules so that traffic from the new links is handled correctly.
2. If you want to be able to manage your existing firewall remotely, add an alias on your firewall for the other links in case the first link is unavailable.

Your Barracuda Link Balancer should be ready for operation. There are a number of other configuration options available. Please refer to the next chapter, *Configuring the Barracuda Link Balancer* on page 19, to review these options.

Replacing Your Firewall Installation

These instructions describe how to deploy the Barracuda Link Balancer as the default gateway for your network, replacing your existing firewall or router.

The steps documented here provide a method to configure the Barracuda Link Balancer completely before connecting it to your production system. This method allows you to copy the firewall configuration of your existing firewall to the Barracuda Link Balancer. A similar process is described in the *Barracuda Link Balancer Quick Start Guide*

Step 1: Prepare for the Installation

Before installing your Barracuda Link Balancer, verify you have the necessary equipment:

- Barracuda Link Balancer, AC power cord (included)
- Ethernet cables
- a PC with a Web browser

Plug in the Barracuda Link Balancer and power it on.

Step 2: Activate the Barracuda Link Balancer with Temporary Network Settings

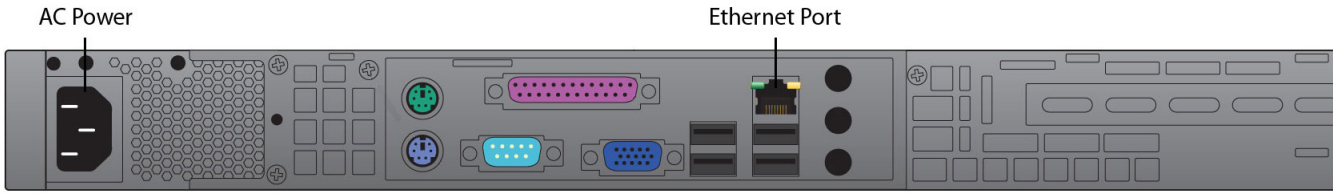
Follow these steps to configure the Barracuda Link Balancer with temporary settings and activate it:

1. Change the network settings of a PC with a Web browser installed to use an IP address of 192.168.200.10, subnet mask of 255.255.255.0 and gateway of 192.168.200.200. Depending on the model, there may be a LAN port on the front of the Barracuda Link Balancer. If there is, connect an Ethernet cable from the PC to that LAN port.

Figure 2.7: Front panel of a Barracuda Link Balancer with LAN port

Otherwise, connect an Ethernet cable from the PC to the LAN port on the back, as shown in *Figure 2.8*.

Figure 2.8: Back panel of the Barracuda Link Balancer



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3. Click **Apply Now** to apply the firmware. Click **OK** to acknowledge the reboot message. Applying the firmware takes a few minutes to complete.
4. After the firmware has been applied, the Barracuda Link Balancer automatically reboots. When the system comes back up, the login page is displayed.

Step 4: Configure Permanent WAN Settings

1. After the Barracuda Link Balancer has rebooted, login to the Web user interface and go to the **Basic > Links** page.
2. For each link that will be connected to this unit:
   - **2a.** Click the relevant WAN port in the graphic.
   - **2b.** In the Links Configuration section enter the details for the link to be connected to the WAN port.

     Some of the configuration information is provided by your ISP - be sure to enter it correctly.
   - **2c.** Click **Save Changes**.

Note: For each WAN interface that has a static IP address, enter all of your externally accessible servers in the **Additional IP Addresses** field. These need to be identified so that traffic can be accepted for them. You will also need to reconfigure the servers with private IP addresses. In the next step you can create firewall 1:1 NAT rules to direct traffic to those systems.

Step 5: Configure the Barracuda Link Balancer Firewall

Create firewall rules on the Barracuda Link Balancer to match the settings of your current firewall. More information about firewall settings can be found at *Configuring the Firewall on page 21*.

1. Go to the **Firewall > Inbound** page to add inbound rules.
2. Go to the **Firewall > Outbound** page to add outbound rules.
3. Go to the **Firewall > NAT** page to add 1:1 NAT and port forwarding rules.

Step 6: Configure Permanent LAN IP Address

1. Change the LAN IP address of the Barracuda Link Balancer to its permanent setting as the default gateway for your network. To change the LAN IP address, go to the **Basic > IP Configuration** page and change the IP Address and Subnet Mask. Click **Save Changes**.
2. The connection to the PC that you were using will terminate.
3. Unplug the cable connecting your PC to the Barracuda Link Balancer.
4. Power down your Barracuda Link Balancer using the power button on the front of the unit.

Step 7: Install in the Production Network

Now that the Barracuda Link Balancer is configured, install it in its permanent location and make it part of your production network:

1. Mount the Barracuda Link Balancer in a 19-inch rack or place it in a stable location. To ensure proper ventilation, do not block the cooling vents on the front and back of the unit.
2. Connect each of the cables from the Internet links into a WAN port on the front of the Barracuda Link Balancer. The ports are labeled WAN1, WAN2, etc. These ports correspond to the WAN ports that you configured in the Web user interface. Be sure to connect them according to your configuration.
3. Unplug your firewall from the network and plug its LAN connection into the LAN port on the front of the Barracuda Link Balancer, if there is one. If there is no LAN port on the front, plug that connection into the LAN Ethernet port on the back panel of the Barracuda Link Balancer. You should see some activity on both the yellow and green lights on the LAN port. If not, you may need to use a crossover cable.
4. If the IP address of the Barracuda Link Balancer is the same as the IP address of the firewall that you removed, you can ignore this step. Otherwise, make the Barracuda Link Balancer the default gateway for the clients by performing these steps:
    - **4a.** Update the configuration of the DHCP server for the clients to give out the LAN IP address of the Barracuda Link Balancer as the default gateway. As the leases are renewed, each client will gain access to the new Internet links.
    - **4b.** Change the default gateway of any clients with static IP addresses to the LAN IP address of the Barracuda Link Balancer.

Step 8: Test Connectivity

Test the connectivity to a client system:

1. If needed, change the gateway IP address of a test system to the LAN IP address of the Barracuda Link Balancer.
2. Confirm that you can access the Internet from the test system. If this works, continue.
3. On the test system, log into the Web user interface using the permanent LAN IP address and go to the **Basic > Links** page. The status of each link should appear as **Connected**. You can see the utilization of each link by moving the mouse over the graphic.
4. On the test system, generate some traffic, by, for example, opening more tabs in the browser of the test system and downloading files from the Internet. FTP files from a number of different sites or use BitTorrent to get the traffic to flow on multiple links. Go to the **Basic > Status** page to view graphs that show the incoming and outgoing traffic for each link..

Note: If you have connectivity issues, clear the ARP caches of your existing network components such as routers and modems. In some cases, you may need to reboot these devices.

There are a number of other configuration options available. Please refer to the next chapter, *Configuring the Barracuda Link Balancer* on page 19, to review these options.

Chapter 3

Configuring the Barracuda Link Balancer

This chapter describes the configuration tasks you can perform from the Web user interface after you have completed the installation. The following topics are covered:

Configuring Network Settings

This section describes network settings that you can configure using the Web user interface. The following topics are covered:

Adding, Updating or Viewing WAN Link Configuration

Every WAN link that enters the Barracuda Link Balancer needs to be manually identified. This information is provided by your Internet Service Provider. Use the **Basic > Links** page to identify the links. You can view the configuration information by moving your mouse over the port. To change or add configuration information, click on the corresponding WAN port on the graphic or the expand button in the Configure column.

Adding a New WAN Link

There are a few things to remember if you are adding one or more new WAN links to an already-configured Barracuda Link Balancer. As already mentioned, all links must be configured using the **Basic > Links** page.

New WAN links that are configured correctly are automatically used for outbound link balancing. For inbound traffic, if the Barracuda Link Balancer firewall is enabled, you can add a NAT rule on the **Firewall > NAT** page to map the destination IP address of the traffic on the new link to an internal service.

WAN IP Impersonation

If the Barracuda Link Balancer firewall is disabled, you can avoid having to update rules on your network firewall to include the new WAN link by choosing to map the destination IP address of traffic on the new link to an existing WAN IP address (usually, an address on WAN1). To do this, select the **NAT/Port Forwarding** option on the **Basic > Links** page. Then create a NAT rule on the **Firewall > NAT** page to map the destination IP address of the traffic on the new link to an external IP address on an existing link.

Authoritative DNS

If you are using authoritative DNS to achieve inbound link load balancing, remember to add any new links with static IP addresses to the list of DNS name servers on the **Services > Authoritative DNS** page. See *If You Add a WAN Link After the Domains are Created* on page 34 for more information.

Adding Static Routes

If you have a separate subnet that needs to be able to use the Internet links that are accessible only through the Barracuda Link Balancer, add a static route to specify a gateway for the subnet so that the return traffic can take the correct path. If you have disabled the Barracuda Link Balancer firewall, then static routes can be added to your network firewall. Otherwise, follow these instructions to add static routes to the Barracuda Link Balancer:

1. On the Web user interface, go to **Advanced > Advanced IP Config**. Add the static routes.
2. Test connectivity from each internal network by changing the gateway IP address of a computer on each subnet to the LAN IP address of the Barracuda Link Balancer. Check that you can access the Internet from each subnet.
3. When testing is complete, update the configuration of the DHCP server for the clients to give out the LAN IP address of the Barracuda Link Balancer as the default gateway. As the leases are renewed, each client will have access to all of the new Internet links.
4. Change the default gateway of any clients with static IP addresses to the LAN IP address of the Barracuda Link Balancer.

Configuring VLANs

The Barracuda Link Balancer supports the IEEE 802.1Q standard for explicitly tagging Ethernet frames with VLAN information. Use the **Advanced > Advanced IP Config** page to identify VLANs. Then create a virtual interface that associates an IP address and netmask with a VLAN. Traffic sent to a virtual interface associated with a VLAN will be tagged with the VLAN ID and delivered correctly.

VLANs may not be on the same subnet.

Creating IP Aliases

You can create virtual interfaces or IP aliases by associating an IP address or subnet with a WAN, LAN or VLAN. Each IP address and netmask can only be associated with one WAN, LAN or VLAN.

Virtual interfaces are used:

- to associate an IP address range with a VLAN
- to associate an externally accessible IP address that is on a different subnet than any WAN link with a WAN link.

Create IP aliases using the **Advanced > Advanced IP Config** page.

Configuring DNS Servers

Use the **Basic > Links** page to set the primary and secondary DNS servers for each WAN link. Your ISP should provide you with these settings.

Configuring Per Interface Health Checks

Use the **Basic > Links** page to configure health checks for each link. Multiple methods are supported. You can enter more than one test target (e.g. resolve the DNS domain names of multiple Web sites) to be sure that the link is actually down. Link failure is shown on this page and on the **Basic > Status** page. Also, if a link fails an SNMP trap will be generated, an email will be sent, and an event will be logged.

Configuring the DHCP Server

The Barracuda Link Balancer can act as a DHCP server. Use the **Services > DHCP Server** page to enable the DHCP server and to configure it.

Configuring the Firewall

The Barracuda Link Balancer can act as a firewall, inspecting network traffic as it arrives and allowing or denying passage based on a set of rules. These rules include inbound, outbound, 1:1 NAT and port forwarding rules. Some of this functionality is available even if the firewall is disabled.

This section covers the following topics:

Firewall Functionality

Using 1:1 NAT and port forwarding rules, the Barracuda Link Balancer can perform:

- 1:1 NAT - Assign external addresses to internal clients.
- Port forwarding (or Port Address Translation) - The traffic to a port across one or multiple links is directed to an internal client.
- Many to 1 NAT - One internal server may receive traffic from more than one WAN link. You can achieve this by creating 1:1 NAT rules or port forwarding rules.
- Port blocking and unblocking.

1:1 NAT and port forwarding rules are executed only if the Barracuda Link Balancer firewall is enabled or, if not, for any WAN link with the **NAT/Port Forwarding** option enabled. Even if the rules are not able to be executed, you can always create rules and save them. This may assist you in configuring the built-in firewall with minimal disruption to your network.

Inbound and outbound firewall rules allow or deny access to remote networks, clients, services and ports. Inbound and outbound firewall rules are executed regardless of firewall status.

The Barracuda Link Balancer firewall also assists in preventing and mitigating distributed denial of service attacks by rate limiting the number of requests that come in to your network.

Order of Execution of Firewall Rules

Firewall rules are arranged in tables from top to bottom in order of precedence. Only the first rule that matches the profile of the traffic is executed.

Inbound Firewall Rules

By default, all connections that are initiated from outside are denied. Add inbound firewall rules to allow exceptions for specific IP addresses, ports and applications. Applications let you define rules that apply to more than one port.

Use the **Firewall > Inbound** page to create firewall rules for incoming packets. If you want to create an inbound rule for an application that is not in the list presented when you add the rule, first go to the **Policy > Applications** page and define a new application.

Inbound 1:1 NAT Rules

When the Barracuda Link Balancer firewall is enabled, externally reachable servers cannot have public IP addresses. You will need to reconfigure these servers with private IP addresses. Identify the public IP addresses as the Additional IP Addresses for a WAN interface that has a static IP address. Then you can create 1:1 NAT rules to direct traffic to your servers.

You can add the public IP addresses as Additional IP Addresses to more than one WAN interface that has a static IP address. All incoming traffic will be forwarded according to the rules you create. This allows traffic to be received by the same internal server from more than one WAN link.

1:1 NAT applies to the IP address only, leaving ports the same on both IP addresses. 1:1 NAT is bi-directional – outbound traffic will include the servers' public IP addresses.

If the Barracuda Link Balancer firewall is disabled, you can create a NAT rule to map the destination IP address of the inbound traffic on one WAN link to another WAN link's IP address. This allows you to add a new WAN link without having to update rules on your network firewall. See *Adding, Updating or Viewing WAN Link Configuration* on page 19 for more details.

When a 1:1 NAT rule is created, an inbound firewall rule to accept traffic for the external IP address is automatically generated. Without this rule, all connections that are initiated from outside are denied. You can view and change this rule – it has a similar Rule Name – using the **Firewall > Inbound** page. You may want to modify that rule to limit access to only those ports or applications that you want to be publicly accessible.

Use the **Firewall > NAT** page to create 1:1 NAT rules and port forwarding rules. If you create a 1:1 NAT rule for an address, there is no need to also create a port forwarding rule.

Port Forwarding Rules

Create port forwarding rules to direct traffic on an external port to a port on an internal IP address. You must specify which WAN link to be used to listen for incoming packets on the port. The return path is handled automatically.

The listen IP address on a specific WAN interface could either be the WAN IP address or any Additional IP address on the same WAN interface. A WAN IP address that is used in any port forwarding rule can not also be used in a 1:1 NAT rule.

You can forward the traffic from a port on multiple WAN links to a port on one internal IP address by creating a rule for each WAN link.

When you add a port forwarding rule, an inbound firewall rule is created automatically to accept traffic on the listen link and port for the private IP address of the server. Without this rule, all connections that are initiated from outside are denied. You can view and change this rule – it has a similar Rule Name – using the **Firewall > Inbound** page.

To add a new port forwarding rule, go to the **Firewall > NAT** page.

Outbound Firewall Rules

By default, all outbound connections are allowed. You can create outbound firewall rules to deny outbound connectivity. For example, you may want to block access to certain online gaming sites that use specific ports.

Use the **Firewall > Outbound** page to create, modify or delete outbound firewall rules. The rules are arranged in the table from top to bottom in order of precedence. Only the first rule that matches the profile of the traffic is executed.

If you want to create an outbound rule for an application that is not in the list presented when you add the rule, go to the **Policy > Applications** page and define a Custom Application.

Firewall Logging

You can view the firewall log displayed on the **Logs > Firewall Log** page to see rules that have been executed and whether the traffic was dropped or allowed. Only rules that have the **Log** check box selected in their rule entry (under the **Firewall** tab) are logged in this way.

Creating Custom Applications

Use the **Policy > Applications** page to view and define applications that can be used in firewall and Quality of Service rules. An application is a combination of a protocol and one or more ports. You can create new applications or use the predefined ones, such as DNS, email, and HTTP.

Managing Bandwidth

The Barracuda Link Balancer allows you to prioritize and control incoming and outgoing traffic and link usage in a variety of ways.

This section covers the following topics:

Link Usage for Inbound and Outbound Traffic

Outbound Link Balancing

By default, when outbound traffic from a client IP address going to a new destination IP address is detected, the weights of the links are compared and the link with the highest weight is used. The weight of a link is the available capacity based on configured link speed and current usage. The weight for each primary and backup WAN link is calculated on an ongoing and frequent basis.

Inbound Link Balancing

Inbound link balancing and failover are available only if the Barracuda Link Balancer acts as an authoritative DNS server for domains behind it.

When the Barracuda Link Balancer receives a DNS query for a hosted domain, it returns the IP address of a WAN link which the client then uses to reach the hosted domain. The algorithm used to select the returned WAN link is the same as the algorithm used for outbound link balancing.

Grouping WAN Links for Inbound and Outbound Traffic

You can change how frequently WAN links are used by assigning each link to one of three groups for both inbound and outbound traffic. This feature allows you to reserve links for certain types of traffic or to use higher cost links only if the lower cost links fail or become saturated.

The supported usage groups are:

- Primary links — used first for link balancing.
- Backup links — used only if the primary links are down or if they become saturated. If all primary links are down or saturated, then traffic is distributed across all available backup links until the primary links become available.

Private links — used only for traffic that matches IP/Application routing rules or if specified explicitly in the configuration of a VPN. Private links are not used at all for default outbound or inbound link balancing. They are used only if explicitly referenced.

If you want to employ default link balancing policy, where the link with the greatest available capacity is used, set the usage group for each link to **Primary**.

To assign each link a usage group, edit the link on the **Basic > Links** page.

Specifying WAN Link for Outbound Traffic

You can override the link balancing algorithm by creating rules that determine which WAN link certain kinds of outbound traffic will use. See *Specifying the Link Used by Outgoing Traffic* on page 26.

Creating Bandwidth or Quality of Service (QoS) Rules

You can create bandwidth rules that specify the priority that the Barracuda Link Balancer gives to outbound traffic. Bandwidth rules are executed after it has been determined which WAN link the traffic will use. These rules apply to all traffic, including VPN traffic, regardless of whether the Barracuda Link Balancer firewall is enabled or not.

Each rule describes a set of traffic based on one or more parameters: source IP address or range, destination IP address or range, application or applications, time, day of the week, and WAN link. If the conditions are met, the rule assigns a bandwidth priority and a contention priority.

The bandwidth and contention priority classes are compliant with the DiffServ specification. DiffServ bits are inserted if the traffic matches the Quality of Service rules on this page. Then, bandwidth and contention priorities are applied based on those bits, even if they were set by another device. Traffic that does not have any DiffServ bits set is assigned the Default class.

If the amount of traffic on the network is more than what can be sent, traffic from high priority applications is allocated a greater share of the bandwidth. The contention priority subdivides traffic that has the same bandwidth priority level.

Some examples of QoS rules:

- Give higher priority to traffic originating from a set of IP addresses.
- Assign lower priority to FTP traffic so that uploading and downloading of files does not impact other applications.
- Increase the priority of SIP traffic so that calls are not dropped.
- Give VPN traffic a high priority. You can do this by creating a rule where the source IP address is the local VPN endpoint and the destination IP address is the remote VPN endpoint.

Configure QoS rules using the **Policy > Bandwidth Mgmt** page.

Configure the priority classes for the QoS rules on the **Policy > Configuration** page. There are 8 classes per WAN link, each consisting of a minimum and maximum value. Traffic with a given class is guaranteed to get at least the minimum bandwidth and will get up to the maximum if it is available.

Outbound Traffic Routing

By default, all outgoing traffic is link balanced and NAT'd. Also, the source IP address of outgoing traffic is the WAN link that is used by the traffic. You can create outbound routing rules to modify these defaults.

This section covers the following topics:

Specifying the Link Used by Outgoing Traffic

To exempt outgoing traffic from link balancing and/or NAT'ing, create IP/application rules using the **Policy > Outbound Routing** page. IP/application routing rules are based on source IP address, application, and/or destination IP address.

The IP/application routing rules are executed before the link load balancing algorithm. Traffic that matches no rule is both link balanced and NAT'd. These rules are executed regardless of the firewall operating mode.

Examples where IP/application routing rules may be useful include:

- If you are an ISP with externally accessible IP addresses (ARIN networks) behind the Barracuda Link Balancer that are not on the same subnet as your WAN interfaces.
- If you have subnets that you want to exempt from link balancing.
- If you have systems such as mail servers or VPN endpoints that send traffic that must maintain the original source IP address.
- If you have applications that you want to exclude from outgoing link balancing and NAT'ing.

Ping Traffic

To direct ping (ICMP) traffic that originates from behind the Barracuda Link Balancer to use a specific WAN link:

- Create a ping application using the **Policy > Applications** page (select ICMP as the protocol, no port range).
- Create one or more IP/application routing rules for the ping application.

As an example, if WAN1 is a private link to an office and WAN2 is a primary link used for other Internet traffic, make two rules: one that directs ping traffic to the office to use WAN1 and one that allows all other ping traffic to use WAN2. (Remember that private links are only used if the link is explicitly referenced).

VPN and Email Rules

During installation, sample disabled IP/application routing rules are automatically created for outgoing VPN and email traffic to prevent it from being link balanced or NAT'd. To enable those rules, select the WAN link to be used for the traffic.

If you would like to link balance outgoing email or VPN traffic because you have created a way to make that acceptable to the receiver, you can leave the rules in their disabled state or delete them. (For example, you may have created multiple SPF or DNS records for the WAN IP addresses).

Externally Accessible IP Addresses

If you would like to direct traffic from externally accessible IP addresses behind the Barracuda Link Balancer to the WAN link that is on the same subnet, create one or more rules where those addresses are the source IP addresses, link balancing and NAT are turned off, and **Primary Link** is set to **Auto**.

If you have a network where the externally accessible IP addresses (ARIN networks that are not in any WAN subnets) can send their traffic on any WAN link, you can create rules so that traffic

originating from those addresses can go out without being NAT'ed. Depending on how the ISP's routers are set up, traffic from these networks can either be link balanced or be bound to one WAN link. For the latter case, select specific primary and backup links.

Changing the Source IP Address of Outgoing Traffic

To set the source IP address of outgoing traffic to a masquerade IP address, rather than the IP address of the WAN link, create outbound source NAT rules using the **Policy > Outbound Routing** page. Outbound source NAT rules consider source IP address (or range) and, optionally, application and WAN link. If a rule match occurs, the specified external IP address is used as the source IP address of the traffic.

The outbound source NAT rules are executed after the WAN link has been determined by the link load balancing algorithm. They are executed regardless of the firewall operating mode.

The rules are arranged in a table on the **Policy > Outbound Routing** page in order of precedence from top to bottom. Only the first rule that matches the profile of the traffic is executed. If the traffic matches a 1:1 NAT Rule the outbound source NAT rules are ignored.

Configuring Virtual Private Networks

The Barracuda Link Balancer can act as an endpoint in a site-to-site VPN tunnel.

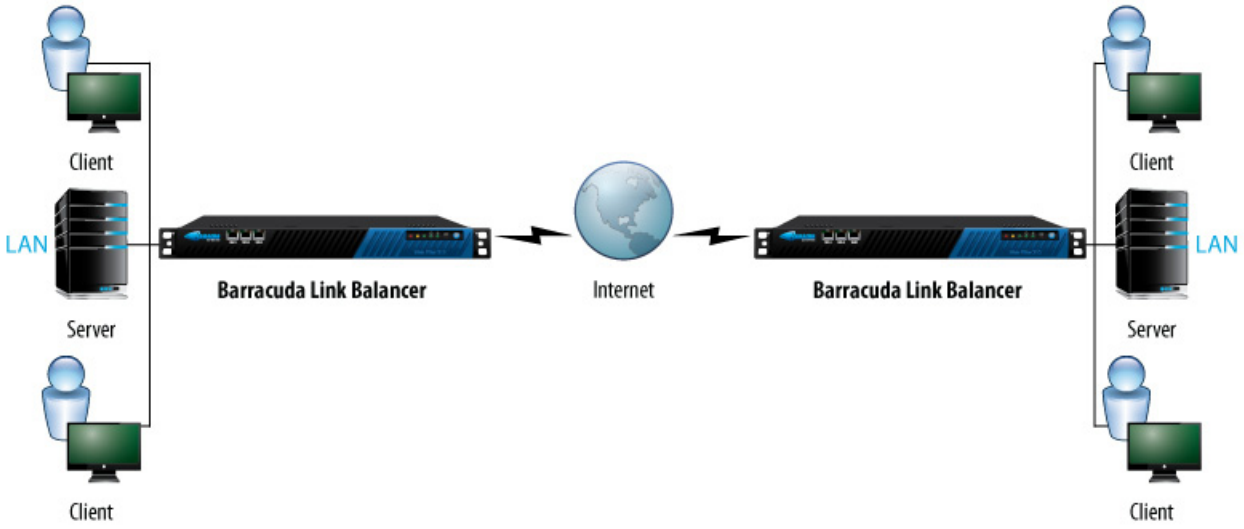
This section covers the following topics:

Site-to-Site VPN Tunnels

You can create a site-to-site VPN tunnel between two Barracuda Link Balancers or between a Barracuda Link Balancer and another device that supports IPsec.

Networks connected via a tunnel will communicate as if they are on the same network, even though they are separated by the Internet.

Figure 3.1: Site-to-Site VPN



The **Services > VPN** page displays all tunnels and their status. You can add, disable, edit or delete a tunnel from this page.

Creating VPN Tunnels

When creating a tunnel, make sure that the relevant tunnel parameters on both ends are in sync. If needed, record the settings on the other endpoint and compare them to the local endpoint. Not matching the settings between the tunnel endpoints is a common cause of failing to establish a tunnel successfully.

Many of the tunnel security parameters are advanced settings and have been given reasonable defaults. If both endpoints are Barracuda Link Balancers use the defaults provided unless you have a specific reason for changing these settings.

For testing purposes, you may choose to start with a shared secret on both endpoints, but using SSL certificates is recommended in a production environment. Upload the local and remote certificates using the **Advanced > Certificates** page.

Creating a VPN in a NAT'd Environment

If either the Barracuda Link Balancer or the remote endpoint is behind a device such as a firewall which is NAT'ing traffic, you must enable the NAT-Traversal (NAT-T) option when creating the VPN tunnel. NAT-T is required to make IPsec and NAT work together. If the option is not enabled, packets will be dropped by the receiving end.

If the remote endpoint for the VPN is behind a NAT'ing device, enter the IP address for the remote endpoint in the **Remote NAT-T IP** field. In this case, the **Primary Remote Gateway** IP address is the NAT'ing device.

If only the local Barracuda Link Balancer is behind a NAT'ing device, the **Primary Remote Gateway** IP address is the remote endpoint and the **Remote NAT-T IP** field should be left blank.

In order for NAT-T to work, open UDP port 4500 on the firewall.The VPN log (on the **Logs > VPN Log** page) will display which VPN endpoint is NAT'd.

Failover and Failback

When configuring a tunnel you can specify a primary and a backup link. If the primary link fails, the tunnel will be reestablished using the backup link. When the primary link is restored, the tunnel will automatically fail back to use the primary link.

VPN Tunnel as Failover Link for a Broken Site-to-Site WAN Link

A VPN tunnel can be configured to act as a failover link replacing a temporarily broken WAN link. To make use of this feature, it is required to have two Barracuda Link Balancers with disabled firewalls in both networks which are to be connected through the failover tunnel. Both Barracuda Link Balancers need to be configured to act as failover WAN endpoints.
To activate the WAN failover, you must select the respective option in the **VPN Status** configuration item of a VPN connection on both Barracuda Link Balancers in order to enable the failover tunnel for WAN1 (or, respectively, one of the other interfaces). If the WAN link fails, the VPN connection will then be activated. When the WAN link is restored, the VPN connection will no longer be used.

Note: External firewalls must be configured properly to allow the VPN failover tunnel.

To make use this feature, please perform the following configuration tasks:

1. Add an IP/APP rule to send all site-to-site traffic via the WAN link and use the VPN as failover for this traffic.
2. Add an IP/APP rule to send all remaining traffic via any WAN link but not expect this traffic to failover to the VPN.

IP/APP rules should be configured as described below to allow this to happen:

- IP/APP rule #1: `Src 192.168.17.0/24, App *, Dst 172.16.1.0/24, LB No, use MPLS, no Backup, no NAT`
- IP/APP rule #2: `Src 192.168.17.0/24, App Ping, Dst 172.16.1.0/24, LB No, use MPLS, no Backup, no NAT`
- IP/APP rule #3: `Src 0.0.0.0/0, App *, Dst 0.0.0.0/0, LB No, use DSL, no Backup, NAT yes`
- IP/APP rule #4: `Src 0.0.0.0/0, App Ping, Dst 0.0.0.0/0, LB No, use DSL, no Backup, NAT yes`

Troubleshooting a VPN Tunnel

If the Barracuda Link Balancer is unable to establish a tunnel then you may be able to discover the problem by checking the following:

- On the **Logs > VPN Log** page, check the VPN Log to see if anything has been logged about the cause of the failure.
- On the **Services > VPN** page, click **Edit** next to the tunnel entry to view the tunnel parameters. Check that the security and authentication values match the tunnel parameters of the other end of the tunnel.
- Check the link status using the **Basic > Status** page.

- Use the tools on the **Advanced > Troubleshooting** page, ping the remote gateway and perform other diagnostics on the network connection.

Configuring the DNS Server for Inbound Load Balancing

Configure the Barracuda Link Balancer as an authoritative DNS Server for your domain or domains to achieve inbound link load balancing.

This section covers the following topics:

Introduction

The Barracuda Link Balancer can act as an authoritative DNS server, returning definitive answers to DNS queries about domain names installed in its configuration. This allows you to define one or more domains that are accessible via more than one WAN link. When asked to resolve a host, the Barracuda Link Balancer will return one of the IP addresses of the available WAN links. This provides two benefits:

- Failover - If one WAN link goes down, the domain is still available via one of the other WAN links.
- Incoming link balancing - Incoming traffic to the domain will be spread across all links that you configure for that domain.

Only WAN links with static IP addresses can be advertised to respond to DNS queries. However, you can accept traffic on any of your WAN links for a domain configured on the Barracuda Link Balancer.

DNS resource records describe the hosts and name servers and other attributes of the domain. Following the instructions provided here and using the user interface of the Barracuda Link Balancer, you can create the records that describe the domain or domains that are hosted on the LAN side of the Barracuda Link Balancer. The supported DNS resource records are described in the section *DNS Records* on page 35

DNS Records Time to Live

As already mentioned, making the Barracuda Link Balancer the authoritative DNS server for the domains that are behind it increases the availability of your hosted servers. When asked for the IP address of a hostname, the Barracuda Link Balancer returns a DNS A record that contains the IP address of one of your WAN links. Every DNS record has a TTL (Time to Live) value. TTL is the length of time that the DNS record may be cached. For most DNS records, two days is a typical and acceptable value. However, A records should have a very short TTL - we recommend 30 seconds. If a WAN link fails, its address will no longer be returned, so the inbound traffic to this host will not be

disrupted. A short TTL value for this record ensures that the cached address for the failed link times out quickly.

Specifying a short TTL for A records also assists in link balancing. Because the address for a host that is returned varies among the available links, the short TTL guarantees that the link used for incoming traffic directed to that host also varies frequently.

Recommended Deployment

We recommend that you take advantage of this feature if you are hosting services such as Web servers, VPNs and email that are name based. This increases the availability of your services and provides a way to do inbound link balancing.

Split DNS

The Barracuda Link Balancer supports a split DNS infrastructure. If the same hostname is used for a resource that is accessible both internally and externally, internal network clients receive the internal IP address and external clients receive the external IP address when they ask for the address of that hostname. Specifically, the A record for the hostname includes two views, one with the internal IP address and one with the external IP address. In this way, clients only see the address that they should use.

Details of how to make this work can be found in *Step 3 - Set up DNS for Internal Clients* on page 33.

The split DNS infrastructure handles accessing resources using a hostname. What about accessing externally accessible resources using an IP address? If local clients use external IP addresses to access internal servers, the Barracuda Link Balancer translates the address and properly forwards those requests back to internal servers.

DNS Zone Transfer Blocking

The Barracuda Link Balancer can be configured to block zone transfers on some or all of the domains that it hosts. An AXFR/IXFR query that is sent from another DNS server to the Barracuda Link Balancer (to request a copy of the DNS records) is rejected if zone transfers are disabled for that domain. By default, zone transfers are enabled for all domains created.

Becoming an Authoritative DNS Host

Table 3.1 provides an overview of the steps required to make the Barracuda Link Balancer an Authoritative DNS host.

Table 3.1: Configuration Steps

Step	Explanation
Enable authoritative DNS on the Barracuda Link Balancer.	Identify which WAN links are to be used as Name Servers.

Table 3.1: Configuration Steps

Step	Explanation
Create the Domain	Define one or more domains on the Barracuda Link Balancer.
Set up and test DNS for Internal Clients.	Make your internal DNS server forward queries to the Barracuda Link Balancer. Configure split DNS.
Add DNS records.	For Web servers and email servers.
Delegate your domain to the Barracuda Link Balancer from your registration service.	Tell the Internet that your domain exists or has changed.
Test external access.	

Step 1 - Enable Authoritative DNS on the Barracuda Link Balancer

Go to the **Services > Authoritative DNS** page and enable Authoritative DNS and each of the WAN links in the table of DNS Server Listen Links. This table includes all WAN links with static IP addresses (configured on the **Basic > Links** page). You can change the value for the Name Server for each link or keep the default. The Name Server value is used as a label for NS records for all the domains. Enter an unqualified name, for example, ns1

Step 2 - Create one or more Domains

Check that the value for Default Domain specified on the **Basic > IP Configuration** page is accurate.

If the built-in firewall is enabled, and if you have created 1:1 NAT rules and/or port forwarding rules, make sure that they use the correct hostname. You can look at those rules on the **Firewall > Authoritative DNS** page.

On the **Services > Authoritative DNS** page create the domain. When you have done this, you should see that the following records are created:

- Start of Authority (SOA) record
- Name Server (NS) record. One NS record for each name server in the DNS Server Listen Links table is generated.
- Address (A) record - One A record is created for each name server in the DNS Server Listen Links table. An A record is also created for each matching hostname found in 1:1 NAT and Port Forwarding rules, as described in the next section.

If the Barracuda Link Balancer has the firewall enabled:

- When you create a new domain, the Barracuda Link Balancer looks for existing 1:1 NAT and port forwarding rules that include names in the Hostname field that have a domain suffix that is the same as the newly created domain name.
- Or, if you create a domain that is the same as your default domain (as specified on the **Basic > IP Configuration** page), the Barracuda Link Balancer looks for rules that have hostnames that do not appear to be fully qualified domain names.
- In either case, an A record for each matching rule, including both external and internal addresses, will be automatically created for each hostname.

The DNS records are created with typical default values. You can see all of the values for each record and change them by clicking **Edit** next to the record in the DNS Records section.

Step 3 - Set up DNS for Internal Clients

If you have an internal DNS server, configure it to forward queries to the LAN IP address of the Barracuda Link Balancer.

If the built-in firewall of the Barracuda Link Balancer is enabled:

As already described, when you create a new domain, the Barracuda Link Balancer looks for existing 1:1 NAT and port forwarding rules that include names in the Hostname field that have appear to be relevant and creates an A record for each matching rule, including both external and internal addresses.

In some cases, this mapping will not reflect your configuration. Using an internal network client, try to access a hostname for a resource that is available both internally and externally. If the test fails, edit the A record for the unresolved hostname. The **DNS Record** page will appear. In the IP Addresses table, add addresses to the Local Network column to be used in response to internal DNS queries.

If the built-in firewall of the Barracuda Link Balancer is disabled:

The Barracuda is not able to derive internal a mapping between external and internal addresses if the firewall is disabled. If you want internal addresses to be served, edit the A record for the hostname of each resource that is available both internally and externally. The **DNS Record** page will appear. In the IP Addresses table, add addresses to the Local Network column to be used in response to internal DNS queries.

Using an internal network client, test your changes by trying to access the resource using its hostname.

Step 4 - Add More DNS Records

Add more DNS records to your domain(s) to match your configuration. For example, each email server needs an MX record and a corresponding A record. Each Web server needs an A record.

If you have externally reachable IP addresses that are not tied to any interface, such as ARIN networks, create an A record for each one:

- If the address is not routed through the Barracuda Link Balancer, select CUSTOM in the **Links** list.
- If the address is routed through the Barracuda Link Balancer, select ANY in the **Links** list.

Step 5 - Update Your Domain Registrar

If you haven't already registered your domain name, register it with a domain name registrar like GoDaddy.com or register.com. Make the NS records of the domain point to your static WAN IP addresses.

If your domain name is already registered, contact your registrar to update the NS records of the domain to point to your static WAN IP addresses. Remove records that reference the domain or domains that are now delegated to the Barracuda Link Balancer.

Hosting a sub-domain

If your domain is hosted at your ISP or elsewhere and you want to delegate a sub-domain to be resolved by the Barracuda Link Balancer, you will have to add some records to the zone file of the domain where it is stored at the registrar. If the domain is example.com, and you want to host my.example.com and you have two name servers ns1 and ns2, add these lines, using the actual IP addresses of your name servers:

```
my     IN    NS    ns1
my     IN    NS    ns2
ns1    IN    A     216.101.241.181
ns2    IN    A     192.0.2.2
```

Then you can create the my.example.com. domain on the Barracuda Link Balancer.

Step 6 - Test

From a host on the Internet, run nslookup on your domain name(s). The returned IP addresses should be the IP addresses of your WAN listen links.

Depending on the change, it may take some time for your changes to be noted throughout the Internet, depending on how long the various resolvers cache DNS responses. For example, it may take a day before a new domain name is accessible via the Internet. If a domain name was previously registered and the DNS record is modified, any server on the Internet that has the previous information will not get the update until the TTL of the original record has passed.

If You Add a WAN Link After the Domains are Created

If, after creating your domains, you add a new WAN link, complete these steps to use the new link for DNS queries (static links only) and inbound link balancing:

1. Go to the **Services > Authoritative DNS** page.
2. If this is a static link and you want it to be used to respond to DNS queries:
   - Identify the new link as a DNS Server Listen Link and assign it a Name Server label.
   - For each domain that is already defined, add a new NS record and a new A record to each domain for the new link.
3. Edit the A records for your servers to enable inbound traffic to be received on the new link for the corresponding internal servers. Specifically, when you edit the A record, on the **DNS Record** page you can select the new WAN link from the **Links** list and add it to the A record.

Zones and Domains

A domain name server stores information about part of the domain name space called a zone. All names in a given zone share the same domain suffix. For example, if barracuda.com is the domain suffix, mail.barracuda.com and eng.barracuda.com are possible sub-domains. These may be all served by one domain name server or some of the sub-domains may be delegated to other domain name servers. Every domain or sub-domain is in exactly one zone.

Rather than make a distinction between a zone and a domain, the user interface of the Barracuda Link Balancer simply asks you to create a domain.

DNS Records

DNS Records Generated when Creating a Domain

When you create a domain on the Barracuda Link Balancer the following records are automatically generated:

- Start of Authority (SOA) record - The SOA record defines the global parameters for the hosted domain or zone. Only one SOA record is allowed per hosted domain or zone.
- Name Server (NS) record - NS records specify the authoritative name servers for this domain. One NS record for each name server in the DNS Server Listen Links table is generated.
- Address (A) record - A records map a hostname to an IP address. Each host inside the domain should be represented by an A record. One A record is created for each name server in the DNS Server Listen Links table. An A record is also created for each matching domain name found in 1:1 NAT and Port Forwarding rules.

Additional DNS Records

Once a zone has been created, you can edit the above records or add NS, A and any of the following records to a zone:

- Mail Exchanger (MX) record - MX records point to the email servers that are responsible for handling email for a given domain. There should be an MX record for each email server, including backup email servers if they exist. If an email server lies within the domain it requires an A record for each name server. If the email server is outside the domain, specify the FQDN of the server, ending with a dot. Example: mail.my-isp.net.
- Text (TXT) record - Text records allow text to be associated with a name. This can be used to specify Sender Policy Framework (SPF) or DomainKeys records for the domain.
- Canonical Name (CNAME) record - A CNAME record provides a mapping between this alias and the true, or canonical, hostname of the computer. It is commonly used to hide changes to the internal DNS structure. External users can use an unchanging alias while the internal names are updated. If the real server is outside the domain, specify the FQDN of the server, ending with a dot. Example: server1.my-isp.net. If a domain name has a CNAME record associated with it, then it can not have any other record types. Do not use CNAME defined hostnames in MX records.
- Service (SRV) record - Service records are used to store the location of newer protocols, such as SIP, LDAP, IMAP and HTTP.
- Pointer (PTR) record - PTR records point to a canonical name. The most common use is to provide a way to associate a domain name with an IP address.
- Other (OTHER) record - Use an OTHER record to add a type of DNS record that is not supported, such as NAPTR.

More information about these records and their attributes can be found in the online help.

Configuring Administrative Settings

This section describes the configuration tasks you can perform from the Web user interface. The following topics are covered:

Controlling Access to the Web User Interface

To control access to the Web user interface, navigate to the **Basic > Administration** page. It allows you to perform the following tasks:

- Allow or deny administration access using the WAN interfaces. Denying access from the WAN interfaces is one way to prevent brute force login attacks on your system. You cannot disable administration access via the LAN.
- Specify the IP addresses or subnet masks of the systems that can access the Web user interface. Attempts to log in from other systems will be denied.
- Change the HTTP port used to access the Web user interface (default is port 8000).
- Change the length of time of inactivity allowed until the administrator is logged out of the Web user interface.

Changing the Default Password

To prevent unauthorized use, change the default administrator password for the Web user interface to a more secure password using the **Basic > Administration** page.

Setting Email Addresses for Alerts

Alert emails are generated automatically by the Barracuda Link Balancer to notify you when, for example, a link is down or if your system is low on disk space. Every SNMP trap (except for the WANx saturated trap) generated causes an email to be sent. Specify the email address that is sent alerts from the Barracuda Link Balancer using the **Basic > Administration** page. To enter multiple addresses, separate each address with a comma. Alert emails, if any have been generated, are sent hourly.

On the **Basic > IP Configuration** page, enter the default hostname and default domain name of the Barracuda Link Balancer. The default hostname and the default domain name are displayed in all alert emails sent by the Barracuda Link Balancer.

Customizing the Appearance of the Web User Interface

Use the **Advanced > Appearance** page to customize the default images used on the Web user interface. This tab is only displayed on certain Barracuda Link Balancer models.

Setting the Time Zone of the System

Use the **Basic > Administration** page to set the time zone of your Barracuda Link Balancer. The current time on the system is automatically updated via Network Time Protocol (NTP).

It is important that the time zone is set correctly because this information is used to coordinate traffic distribution and in all logs and reports. If two Barracuda Link Balancers are to be clustered, the time zone must be the same on both before the cluster can be created.

Note: The Barracuda Link Balancer automatically reboots when you change the timezone.

Enabling SSL for Administration

You can choose to require that only secure SSL connections can access the Web user interface. SSL ensures that your passwords and the rest of the data transmitted to and received from the Web user interface are encrypted. The **Advanced > Secure Administration** page allows you to configure SSL.

In order to only allow secured connections when accessing the Web user interface, you need to supply a digital SSL certificate which will be stored on the Barracuda Link Balancer. This certificate is used as part of the connection process between client and server (in this case, a browser and the Web user interface on the Barracuda Link Balancer). The certificate contains the server name, the trusted certificate authority, and the server's public encryption key.

The SSL certificate which you supply may be either private or trusted. A private, or self-signed, certificate provides strong encryption without the cost of purchasing a certificate from a trusted certificate authority (CA). However, the client Web browser will be unable to verify the authenticity of the certificate and a warning will be sent about the unverified certificate. To avoid this warning, download the Private Root Certificate and import it into each browser that accesses the Barracuda Link Balancer Web user interface. You may create your own private certificate using the **Advanced > Secure Administration** page.

Instead of a private certification, you may also use the default pre-loaded Barracuda Networks certificate. The client Web browser will display a warning because the hostname of this certificate is "barracuda.barracudanetworks.com" and it is not a trusted certificate. Because of this, access to the Web user interface using the default certificate may be less secure.

A trusted certificate is a certificate signed by a trusted certificate authority (CA). The benefit of this certificate type is that the signed certificate is recognized by the browser as trusted, thus preventing the need for manual download of the Private Root Certificate. Use the **Advanced > Secure Administration** page to create a Certificate Signing Request which you can submit to a Certificate Authority to purchase a trusted certificate.

Chapter 4

Creating a High Availability Environment

This chapter describes how to create a high availability environment by clustering two Barracuda Link Balancers. It includes the following topics:

Overview

The High Availability option allows you to link two Barracuda Link Balancers as a clustered active-passive pair. Both systems are connected to the WAN links, but only one is actively processing traffic at any time. The two systems continuously share almost all configuration settings and monitor each other's health.

If clustering two Barracuda Link Balancers is not a viable option, as an alternative, consider configuring Ethernet Passthrough. This feature is only available on certain models.

Ethernet Passthrough

If Ethernet Passthrough is configured and if the Barracuda Link Balancer fails, all traffic from WAN1 will be passed directly to the LAN. Do not enable this feature in these cases:

- If your network is relying on the Barracuda Link Balancer firewall to perform IP or port address translation for internal IP addresses.
- If you have clustered systems, because the passive system will take over if this system fails.

Configure the Ethernet Passthrough option by using the **Advanced > High Availability** page.

Operation of High Availability (HA)

The active system in a clustered pair handles all of the traffic until one of the following components experiences a failure or an outage:

- Its connection to the LAN.
- All of its WAN links (administrator configurable option).
- The Barracuda Link Balancer itself.

When one of these conditions is detected, the passive system becomes active and link balances the traffic from the WAN links.

Clustered Barracuda Link Balancers communicate according to the Virtual Router Redundancy Protocol (VRRP) specification. Both are configured with a single virtual IP address called the VRRP virtual IP address. This address is serviced only by the active system. If the Barracuda Link Balancer firewall is enabled, then the VRRP virtual IP address is the default gateway for devices on the LAN.

In the event of a system failure, the other system in the cluster will assume the VRRP virtual IP address and take on the role of the active system in the cluster. An alert message will be sent to the administrator.

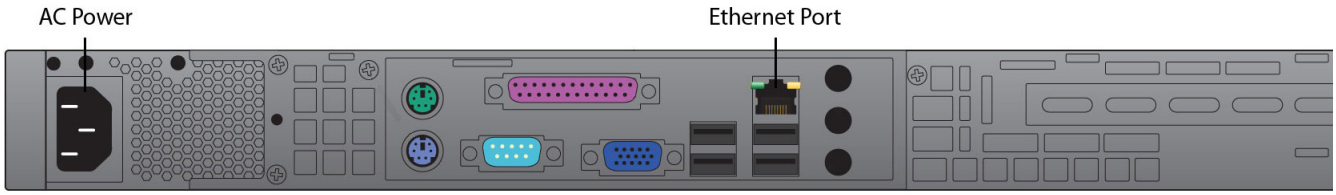
It is recommended that you use the VRRP virtual IP address to manage the Barracuda Link Balancer since that always points to the active system. Changes will automatically be propagated to the passive system.

Physical Connectivity of the Clustered Systems

All Barracuda Link Balancer cluster pairs may be linked using the LAN interface. Certain models also support a LAN2 interface: if there is a physical LAN port on the front panel, the Ethernet port on the back is the LAN2 port.

Figure 4.1: Front panel of a Barracuda Link Balancer with LAN port

Figure 4.2: Back panel of the Barracuda Link Balancer



Linking the two systems using the LAN2 port ensures that communication between the two systems will not be delayed or compromised by other traffic on the LAN. It increases the reliability of the connection between the two systems and may reduce the time required for failover to occur.

Use a crossover cable between the LAN2 ports to connect the two systems. The LAN2 IP addresses must be on the same subnet.

Requirements for Clustered Systems

Before joining two systems together, each Barracuda Link Balancer must meet the following requirements:

- Be model 330 or higher.
- Be the same model as the other Barracuda Link Balancer.

- Be activated and on the same version of firmware. The High Availability capability is only available on firmware 2.x and later.
- Be able to reach the other Barracuda Link Balancer on the LAN interface. This last requirement applies only if you do not plan to use the LAN2 port for clustering.

Synchronization of Data Between Clustered Systems

When two Barracuda Link Balancers are initially joined, most configuration data, such as WAN settings, firewall rules, VPN settings and operating mode, is copied from the primary system in the cluster to the backup system (the system that joins the cluster). This configuration data is synchronized between the systems on an ongoing basis.

However, these configuration data are unique and are *not* synchronized between the two systems:

- LAN IP address, LAN2 IP address, DNS servers, default domain and time zone.
- System password, time zone and Web interface HTTP port, as configured on the **Basic > Administration** page.
- All parameters on the **Advanced > Appearance** page.
- The HTTPS port and SSL certificate used to access the Web interface, as configured on the **Advanced > Secure Administration** page.

Failover and Failback

There is an automatic failback option that can be configured if you want the originally active (primary) system to resume link balancing upon its recovery after a failover. This option can be found on the **Advanced > High Availability** page. Alternatively, you can manually switch to the primary system using the Failback command that is available on the same page.

Planning Your High Availability Deployment

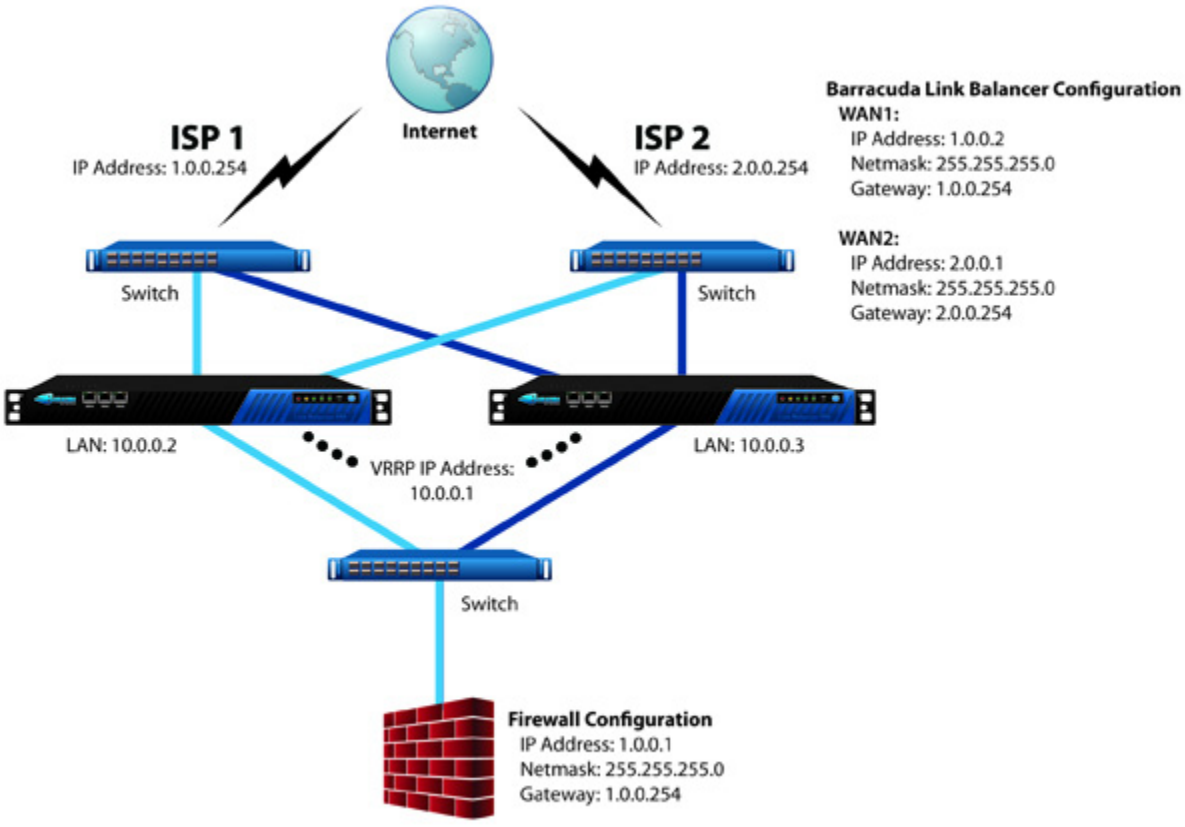
Extra equipment may be needed to support the clustered Barracuda Link Balancers.You may need to add switches so that the WAN links can connect to two systems. If deploying in front of an existing firewall, you will need to add a switch between the Barracuda Link Balancers and the firewall (or two switches for dual firewalls).

The following figures show examples of deployments of a pair of clustered Barracuda Link Balancers with two clustered firewalls, with one firewall and with no external firewall.

In Front of Single Network Firewall

Figure 4.3 shows two Barracuda Link Balancers deployed with one network firewall. The LAN IP addresses of the two Barracuda Link Balancers and the VRRP virtual IP address must all be on the same subnet.

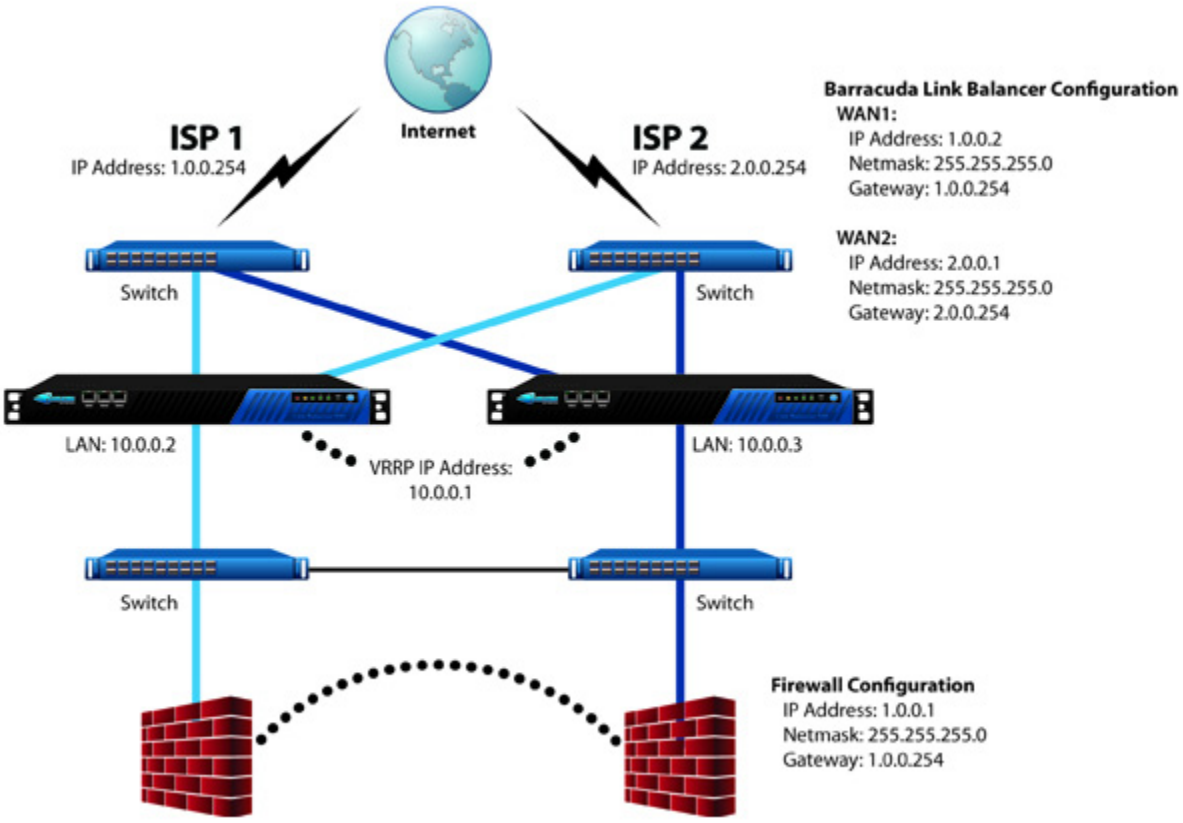
Figure 4.3: Deployment Example - Single Firewall



In Front of Dual Network Firewalls

Figure 4.4 shows two Barracuda Link Balancers and two clustered firewalls. The LAN IP addresses of the two Barracuda Link Balancers and the VRRP virtual IP address must all be on the same subnet.

Figure 4.4: Deployment Example - Dual Firewalls

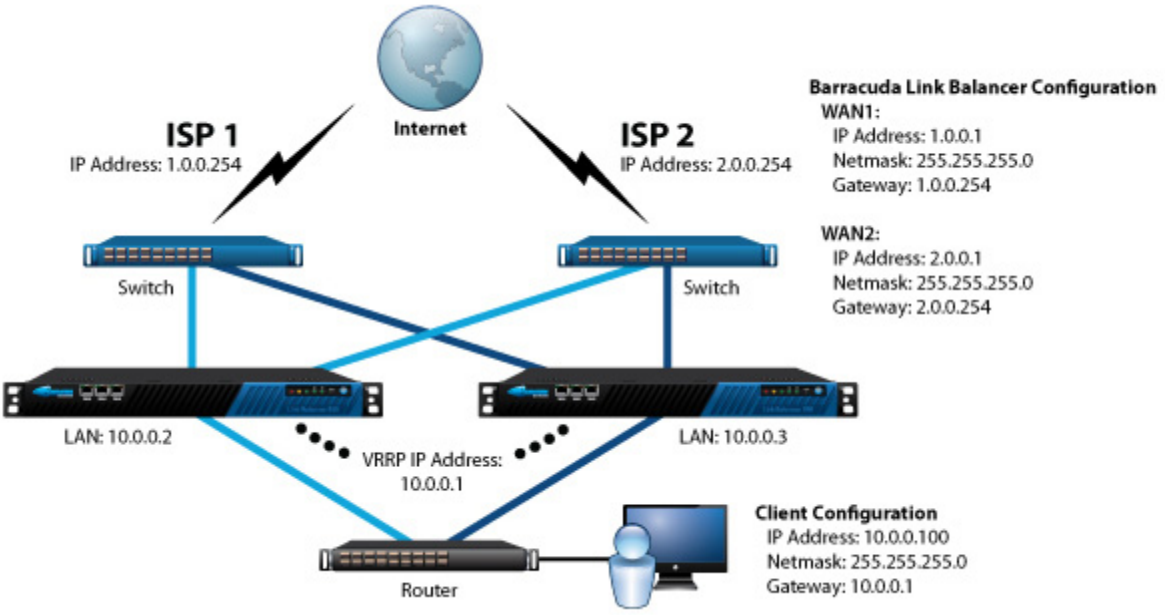


No External Firewalls

Figure 4.5 shows two Barracuda Link Balancers with the firewall enabled. As in the other deployment examples, the LAN IP addresses of the two Barracuda Link Balancers and the VRRP virtual IP address must all be on the same subnet. Note that only in this example the VRRP virtual IP address is the default gateway for devices on the LAN.

If you are adding a second Barracuda Link Balancer to a network where the gateway of the client devices were already configured to use the LAN IP address of the first Barracuda Link Balancer, you can assign a new LAN IP address to that Barracuda Link Balancer, and use its original LAN IP address as the VRRP virtual IP address.

Figure 4.5: Deployment Example - No External Firewall



Creating a Cluster

These instructions describe how to deploy a pair of Barracuda Link Balancers in a cluster. You can also find detailed configuration steps and descriptions of clustering parameters in the online help of the Web interface.

Prior to clustering the Barracuda Link Balancers, you should first place the systems into their production IP address range. This will allow you to avoid having to reconfigure the cluster later because of an IP address change.

Step 1: Complete Installation Process for Both Systems

To prepare the Barracuda Link Balancers for clustering, put both systems in the production location on the network. Complete the following steps:

1. If the primary system is a brand new, unconfigured system, then you will need to completely install, configure and test the primary system as described in *Installing the Barracuda Link Balancer* on page 7.

   If the primary system is already configured and operational, update its firmware. If the firewall is enabled, change its LAN IP address to a new value. The original LAN IP address will be used as the VRRP virtual IP address.
2. On the backup system:
   - Configure a WAN link and connect to the Internet.
   - Activate the system (**Basic > Status**).
   - Configure the LAN IP address, LAN2 IP address (optional) and the default domain (**Basic > IP Configuration**).
   - Set the time zone to be the same as that of the primary system (**Basic > Administration**).
   - Update the firmware (**Advanced > Firmware Update**).
   - Connect to the LAN.
   - If using the LAN2 ports, connect them using a crossover cable.

Step 2: Create the Cluster

Navigate to the **Advanced > High Availability** page on both systems and perform the following steps:

1. On the primary system, enter values into the fields in the **Cluster Settings** section, and save your changes.
2. On the backup system, enter the same values for the cluster settings and save your changes. In the **Clustered Systems** section, enter the LAN2 IP address of the primary system (if it is to be used) or the LAN IP address of the primary system and click **Join Cluster**. The backup system will reboot.
3. When the backup system comes back up, refresh the **Advanced > High Availability** page on both systems and verify that
   - Each system's LAN or LAN2 IP address appears in the **Clustered Systems** table.
   - The status of each system is green.

The systems are now joined. The shared configuration settings of the primary system (as listed in *Synchronization of Data Between Clustered Systems* on page 41) will be copied to the secondary system, and each system will begin monitoring the health of the other system.

Step 3: Connect WAN Links and Test

Connect all WAN links to the backup Barracuda Link Balancer.

To test the clustering capability, power off the active system. The backup system should take over the link balancing function. Power the system back on to test automatic failback.

If you chose the option to failover if all WAN links are down, then test this by removing the WAN links from the active system.

Step 4: Put in Production

From now on, always use the VRRP virtual IP address to manage the Barracuda Link Balancer so that you can be sure that any changes that you make will occur immediately on the active system.

Removing a System from a Cluster

You can find detailed instructions to separate clustered Barracuda Link Balancers in the online help. The system that is to be removed from the cluster must have its cluster settings erased and its network links disconnected. If another system is not taking its place in the cluster, the remaining system should have its cluster settings removed, and possibly also have its LAN IP address changed to what had been the VRRP virtual IP address.

Use the LAN IP addresses of the Barracuda Link Balancers to access their Web interfaces while separating them. As soon as one system is removed from the cluster the VRRP virtual IP address will not be usable.

Updating Firmware on Clustered Systems

In order to ensure that the transfer of control from one system to the other does not happen while a firmware update is in process, you must disable automatic failback on the **Advanced > High Availability** page before attempting to update the firmware on either system. We recommend that you update the firmware on the passive system first, and then update the firmware on the active system. Enable automatic failback again, if desired, after both systems have been updated and are back online.

Chapter 5
Monitoring the System

This chapter describes the tasks you can do to check on the performance of the Barracuda Link Balancer. This section covers the following topics:

Checking Status

Check the **Basic > Status** page for an overview of the health and performance of your Barracuda Link Balancer, including:

- Utilization and status of the links.
- The subscription status of Energize Updates.
- System and hardware statistics, including CPU temperature and system load. Performance statistics displayed in red signify that the value exceeds the normal threshold.
- Incoming and outgoing traffic statistics for each WAN link.

You can also view WAN link utilization and connection status by scrolling over the WAN port graphic on the **Basic > Links** page. View the status of VPN tunnels using the **Services > VPN** page.

Viewing Logs

The Barracuda Link Balancer provides three types of logs under the **Logs** tab:

- Event Log - general system events.
- Firewall Log - firewall events.
- VPN Log - information about VPN tunnels.

Using the Web user interface, you can delete the log, filter the log entries that are displayed or export them to a CSV file.

View the system log displayed on the **Logs > Event Log** page to see events that have occurred. These include:

- Link status - A WAN link has become active or gone down; a link could not be detected.
- DHCP events - An IP address was handed out.
- Failed login attempts.

If the Barracuda Link Balancer firewall is enabled, you can view the firewall log on the **Logs > Firewall Log** page to see rules that have been executed and whether the traffic was dropped or allowed. Only rules that have the **Log** check box selected in their rule entry (under the **Firewall** tab) are logged in this way.

Check recent VPN tunnel activity by using the **Logs > VPN Log** page.

When any of these logs reaches their predetermined size a new log is started.

To have these logs emailed or sent to an FTP or SMB server on a regular basis, use the **Basic > Reports** page (models 330 and above).

Using a Syslog Server to Centrally Monitor System Logs

Syslog is a standard UNIX/Linux tool for logging messages and is available on all UNIX/Linux systems. The Barracuda Link Balancer writes to the syslog for link and system events. Use the **Advanced > Syslog** page to specify servers to which syslog data is sent.

SNMP Monitoring

Your SNMP monitor or other network management program can query the Barracuda Link Balancer SNMP agent for WAN link traffic statistics, amount of traffic going to and from the LAN, and hardware status. You can also receive SNMP traps that are generated if the WAN links become unavailable or if the Barracuda Link Balancer exceeds certain thresholds such as disk space usage.

To allow SNMP access to the Barracuda Link Balancer, navigate to the **Basic > Administration** page. On that page you can:

- Configure the Barracuda Link Balancer to accept and respond to SNMP queries.
- Update the SNMP community string.
- Set the SNMP version. Version 2c and version 3 are supported.
- Enter a range of IP addresses that are allowed to connect to the Barracuda Link Balancer using SNMP.
- Configure IP addresses that will be sent SNMP traps.

An SNMP monitor can access the Barracuda Link Balancer via any of the WAN or LAN IP addresses, although using the LAN is recommended in case one of the WAN links goes down.

Obtain and import these two MIB files to your SNMP monitor:

- The Barracuda Link Balancer MIB
- The Barracuda Reference MIB (standard across all Barracuda Networks products).

The MIB files are located on the Barracuda Link Balancer and can be obtained by replacing [LB IP] in the following URLs with a management IP address of your Barracuda Link Balancer:

- http://[LB IP]:8000/Barracuda-BWB-MIB.txt
- http://[LB IP]:8000/Barracuda-REF-MIB.txt

SNMP Traps

An SNMP trap is generated by the Barracuda Link Balancer SNMP agent every five minutes if one of the following conditions is noted:

- CPU temperature exceeded its threshold.
- System temperature exceeded its threshold.
- CPU fan is dead.
- System fan is dead.
- Firmware storage exceeded its threshold.
- Log storage utilization exceeded its threshold.
- WANx is down.
- WANx is up.
- WANx reached configured saturation threshold.
- A high availability state change occurred.

Traps are sent to the SNMP trap receivers that are specified on the **Basic > Administration** page.

When any of these events is first noted, an email alert is sent to the system alerts email address specified on the **Basic > Administration** page. If an error condition continues to be detected, an email is sent every hour to the same email address.

System Reports

Note: Reporting is only available on models 330 and above.

Use the **BASIC > Reports** page to choose from a variety of information that can help you keep track of activity performed by the Barracuda Link Balancer. You can either generate a report on-demand for instant viewing or you can automatically generate scheduled reports for later delivery.

Reports can include any of the following trends:

- The average bandwidth usage by hour
- The total traffic by date
- The total link uptime by date
- The average VPN bandwidth usage by hour
- The VPN traffic by date
- The average TCP connections per hour
- The TCP connections by date

Reports can also include any of the following logs:

- Inbound link balancing
- Firewall activity
- VPN activity
- Link failover events
- Device failover events

The **Report Options** section allows you to choose the criteria for compiling the report data, as well as layout and output options. You can define a time frame for the report, select the interface links and VPN tunnels to include, and choose to analyze inbound traffic, outbound traffic, or both. It is also possible to select a layout for the graphical charts (available are lines, horizontal or vertical bars, or pie charts) as well as one of the offered output formats HTML, PDF, plain text, or comma-separated CSV.

Trend graphs can be selected to be included into the report as well as a choice of activity log summaries.

Note: If any VPN information was selected to be included with the report, the report can not be scheduled or executed without adding at least one VPN tunnel.

After making your choices, you may either execute report generation at once by saving the screen now, or you may schedule it for later and/or repeating execution by filling in the fields in the **Schedule Report** section. There, you start by filling in a report group name, followed by selecting your delivery options where you may either choose e-mail as the transport method, or an external server for FTPing or SMBing it. If you choose the latter, you will see a couple more fields in which you must provide the external server's IP address or hostname and the user credentials.

Once a report was scheduled, it will be listed in the **Scheduled Reports** section below from where it can be edited, disabled or deleted.

Viewing System Tasks

Go to the **Advanced > Task Manager** page to see a list of tasks that are in the process of being performed and any errors encountered when performing these tasks. Background tasks include firmware download and configuration restoration.

Chapter 6

Maintaining the Barracuda Link Balancer

This chapter describes how to maintain the Barracuda Link Balancer. The following topics are covered:

Backing up and Restoring Your System Configuration

Back up and restore the configuration of your Barracuda Link Balancer using the **Advanced > Backup** page. You should back up your system on a regular basis in case you need to restore this information on a replacement Barracuda Link Balancer or in the event the current system data becomes corrupt.

If you are restoring a backup file on a new Barracuda Link Balancer that is not configured, first enter the new system's IP address and DNS information on the **Basic > IP Configuration** page.

The following information is not included in the backup file:

- System password
- System IP information
- DNS information

Updating the Firmware of Your Barracuda Link Balancer

The **Advanced > Firmware Update** page allows you to manually update the firmware version of the system or revert to a previous version. The only time you should revert back to an old firmware version is if you recently downloaded a new version that is causing unexpected problems. In this case, call Barracuda Networks Technical Support before reverting back to a previous firmware version.

If there is a more recent firmware version available than what is already installed, the **Download Now** button will be enabled.

Applying a new firmware version will result in a short service outage.

Replacing a Failed System

Before you replace your Barracuda Link Balancer, use the tools provided on the **Advanced > Troubleshooting** page to try to resolve the problem.

In the event that a Barracuda Link Balancer fails and you cannot resolve the issue, customers that have purchased the Instant Replacement service can call Technical Support and arrange for a new unit to be shipped out within 24 hours.

After receiving the new system, ship the old Barracuda Link Balancer back to Barracuda Networks at the address below with an RMA number marked clearly on the package. Barracuda Networks Technical Support can provide details on the best way to return the unit.

Barracuda Networks
3175 S. Winchester Blvd.
Campbell, CA 95008

Note: To set up the new Barracuda Link Balancer so it has the same configuration as your old failed system, restore the backup file from the old system onto the new system, and then manually configure the new system's IP information on the **Basic > IP Configuration** page. For information on restoring data, refer to *Backing up and Restoring Your System Configuration* on page 51.

Reloading, Restarting, and Shutting Down the System

The **System Reload/Shutdown** section on the **Basic > Administration** page allows you to shutdown, restart, and reload system configuration on the Barracuda Link Balancer.

Shutting down the system powers off the unit. Restarting the system reboots the unit. Reloading the system re-applies the system configuration.

You can also reboot the Barracuda Link Balancer by pressing **RESET** on the front panel of the Barracuda Link Balancer.

Do not press and hold the **RESET** button for more than a couple of seconds. Holding it for five seconds or longer changes the IP address of the system. See *Using the Reset Button to Reset the LAN IP address* on page 52 for more information.

Using the Reset Button to Reset the LAN IP address

The Barracuda Link Balancer is assigned a default LAN IP address of 192.168.200.200. You can change this IP address in one of three ways:

- navigate using the Web user interface to the **Basic > IP Configuration** page
- connect a VGA monitor and a keyboard to the back of the Barracuda Link Balancer and using the Administrative Console (username **admin**, password **admin**)
- or press the **RESET** button on the front panel.

Pressing **RESET** for five seconds sets the LAN IP address to 192.168.200.200. Pressing **RESET** eight seconds changes the LAN IP address to 192.168.1.200. Pressing the button for 12 seconds changes the LAN IP address to 10.1.1.200. You will notice the three LEDs on the front panel flash at the same time intervals.

Using the Built-in Troubleshooting Tools

The **Advanced > Troubleshooting** page provides various tools that help troubleshoot network connectivity issues that may be impacting the performance of your Barracuda Link Balancer. You can perform a number of connectivity tests such as ping, telnet, dig/nslookup, TCP dump, and traceroute.

Barracuda Networks Technical Support may ask you to make a connection to Barracuda Central so they can help diagnose problems on your system.

Rebooting the System in Recovery Mode

If your Barracuda Link Balancer experiences a serious issue that impacts its core functionality, you can use diagnostic and recovery tools that are available at the reboot menu to return your system to an operational state.

Before you use the diagnostic and recovery tools, do the following:

- Use the built-in troubleshooting tools on the **Advanced > Troubleshooting** page to help diagnose the problem.
- Perform a system restore from the last known good backup file.
- Contact Barracuda Networks Technical Support for additional troubleshooting tips.

As a last resort, you can reboot your Barracuda Link Balancer and run a memory test or perform a complete system recovery, as described in this section.

To perform a system recovery or hardware test:

1. Connect a monitor and keyboard directly to your Barracuda Link Balancer.
2. Reboot the system by doing one of the following:
   - Click **Restart** on the **Basic** > **Administration** page.
   - Press the Power button on the front panel to turn off the system, and then press the Power button again to turn the system back on.

   The Barracuda splash screen displays with the following three boot options:

   ```
   Barracuda
   Recovery
   Hardware_Test
   ```
3. Use your keyboard to select the desired boot option, and click **Enter**.

   You must select the boot option within three seconds of the splash screen appearing. If you do not select an option within three seconds, the Barracuda Link Balancer defaults to starting up in the normal mode (first option).

   For a description of each boot option, refer to *Reboot Options* on page 54.

Reboot Options

Table 6.1 describes the options available at the reboot menu.

Table 6.1: Reboot Options

Reboot Options	Description
Barracuda	Starts the Barracuda Link Balancer in the normal (default) mode. This option is automatically selected if no other option is specified within the first three (3) seconds of the splash screen appearing.
Recovery	Displays the Recovery Console where you can select the following options: • **Perform file system repair**—Repairs the file system on the Barracuda Link Balancer. • **Perform full system re-image**—Restores the factory settings on your Barracuda Link Balancer and clears out all configuration information. • **Enable remote administration**—Initiates a connection to Barracuda Central that allows Barracuda Networks Technical Support to access the system. Another method for enabling this troubleshooting connection is to click **Establish Connection to Barracuda Central** on the **Advanced > Troubleshooting** page. • **Run diagnostic memory test**—Runs a diagnostic memory test from the operating system. If problems are reported when running this option, we recommend running the Hardware_Test option next.
Hardware_Test	Performs a thorough memory test that shows most memory related errors within a two-hour time period. The memory test is performed outside of the operating system and can take a long time to complete. Reboot your Barracuda Link Balancer to stop the hardware test. You may do this by pressing **Ctrl-Alt-Del** on the keyboard, or by pressing the **RESET** button on the Barracuda Link Balancer.

Appendix A

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